MODEL AIRPLANE NEWS

MARCH 1953—25 CENTS

BRITISH SE-5

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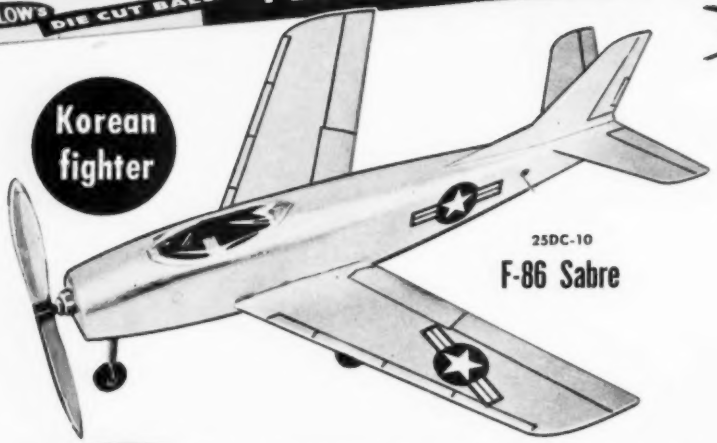
Korean fighter



25DC-10
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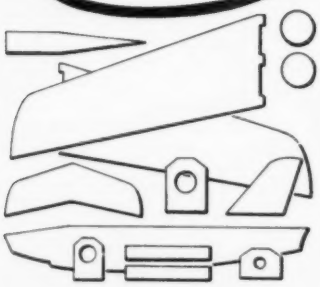
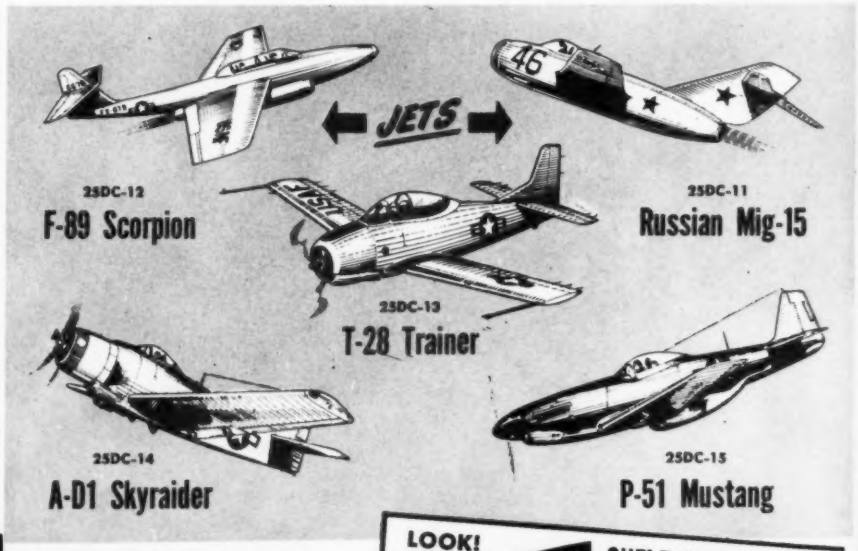


Die-cut Balsa Parts



25DC-12
F-89 Scorpion

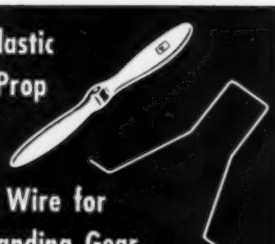
25DC-11
Russian Mig-15

25DC-13
T-28 Trainer

25DC-14
A-D1 Skyraider

25DC-15
P-51 Mustang

Plastic Prop



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No. Am. P-51 Mustang
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Lockheed C-69 Constellation
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MARCH 1953 VOL. XLVIII—No. 3

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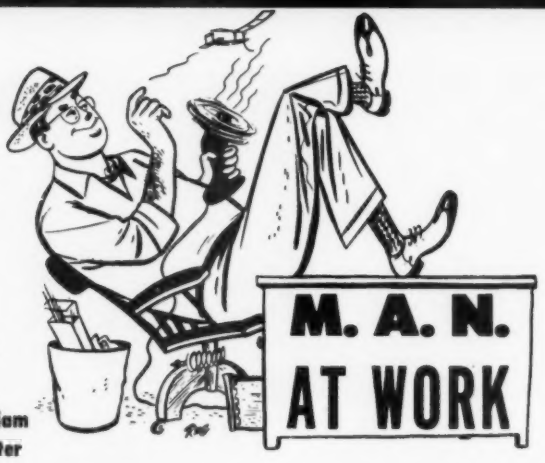

by William Winter

Now we have seen everything, was MAN at Work's reaction to the new rules (AMA News). Must be the new generation of modelers for how else can one explain the awakening of interest (at long last) in international events? Or the willingness to make radical changes. Traditionally, contest modelers permitted rule changes only over their dead bodies and, as far as international participation was concerned, thought like the Brooklynite who believed America consisted of Brooklyn, Texas, and California. The best thing that ever happened to us was the five successive goose eggs in the Wakefield—opened our eyes, let's say. But getting back on the main line, don't you attach great significance to the substitution of the Nordic rules in towline? We certainly aren't going to scuttle our U. S. rules set-up all down the line but, if the trend continues toward international competition in Nordic, Wakefield, free flight and control line, the possibilities strain the imagination.

A true world wide Internationals for the four major modeling events will drastically effect design, contests, and the very nature of modeling in this country. The selection of a U. S. team versed in these varied events probably would take place during competition at our own Nationals the preceding year. The present Wakefield elimination scheme would be altogether inadequate once free flight, control line, and glider come into the picture. For a chance to compete in the Internats, contest minded modelers would bust a gusset to make the Nationals for the team eliminations. In time, semi-finals would tie in with big regional meets. It isn't inconceivable that ways and means would be found to award expense paid trips to the Nats for such semi-final winners. Financing the four-event team to an Internats should prove practical. Its importance and publicity value for air modeling as an activity, especially to the industry, would be too obvious to miss.

Dear Sir—you-cur letters will descend upon us for this but the old scheme of holding the meet in the country that won the year before will not work without important modifications. It is entirely possible that a combination of distance and, perhaps, local superiority in one or two events, would result in an Internats being held so many years successively in the same land that universal participation would drop off. Dare say that the Wakefielders wouldn't mind a trip to Italy (as a change), instead of the annual pilgrimage to Scandinavia. International meets should move around more than they do, at least for the beneficial effects on the activity in the different lands that would be host from year to year. So, once any country has been host to an Internats for two successive years, MAN at Work believes the affair should automatically be awarded for the third year to the highest ranking nation that had not previously been a host, or had not been host within the past, perhaps, say ten years. Assuming, of course, that such a nation would want to be host. If not, it could waive the honor to the next country in line.

(Continued on page 8)

PLANE ON THE COVER—BRITISH SE-5

This month's cover, the British SE-5 World War 1 fighter, is second in the new series of Jo Kotula covers depicting famous, historical aircraft. The squarish, compact, but businesslike SE-5 is one plane that never will be forgotten, both in full scale and as a model. As a model, it has proved a beautiful flier—free flight or control line. We invite our readers to send us the name of their all-time favorite. Future subjects will be picked accordingly.

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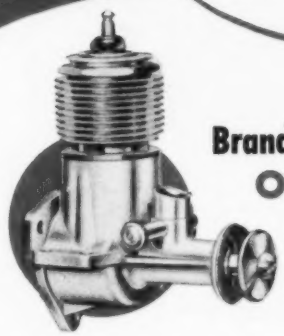

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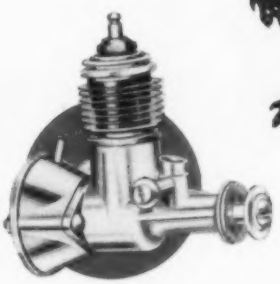

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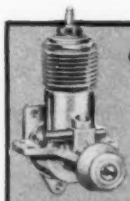

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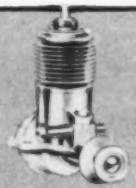

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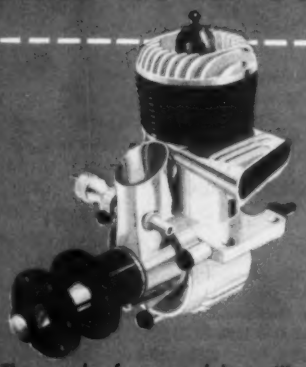

Thousands of new modelers will be discovering this great engine, together with its PowORmates the O & R 29 and 33, also scheduled for 1953 production.

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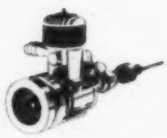

LOS ANGELES, CALIFORNIA • WILMINGTON, DELAWARE

Scrap ...Box

by Jim Saftig

What do they do in Minnesota in the winter? Why, fly models, of course. Big contest on White Bear Lake. A Ladies Auxiliary, too. From Cal to Israel, everybody flies this month.

Meidad, our correspondent in Israel, sent us some mighty fine pictures of the models that are being flown. Got quite a bang out of the way E. Jofe towed his original OK .099 job around at the flying field. Seems all it takes is a length of line to the tail skid. The ship is pulled around in this manner with little or no trouble. Meidad was sporting a mighty slick original with a 50" span, power Mac .19. Big winner of the day was Berkeley's *Sandy Hogan* Mac .29 powered job. Enjoyed the pic of S. Bratshtein's big towliner that had an amazing resemblance to the German "Voya." We felt quite pleased to receive a snap of the first speed job ever built in Israel. It was designed by Meidad, built by E. Jofe, and flown by Meidad at a sharp 139 kmh. Power—Mac 29. Looks like these lads have plenty of "knowhow" per making the mills turn. This particular job used a ram air duct. The last photo that we received gave us a look at several different models including some of the Tel-Aviv *Broncs* (u-control trainers) along with some deisel powered f.f models. The Jetex 200 powered f.f models and beginners gliders all looked excellent. Also received one of the cards that are affixed to each model that is flown. Meidad translated it for us. "Please return this model to: Address: or to the nearest Police Station. The model was found at: Time: Thanks—*Israel Aero Club.*"

* * *

Around New York, three of the largest f.f clubs in the Long Island area decided to hold a series of inter-club contests. The represented groups were the *Prop Spinners, Screamin' Demons,* and the *Skyscrapers.* Main reason for the contests was to increase good will among the various clubs of the area. The boys also wanted to see which gang had the best contest fliers. Top club so far in the standings is the *Skyscrapers.* The round robin tournament is still on so . . . Inter-club meets are rather rare in the East. Hope this trio of clubs starts the ball rolling.

While we're plugging club meets, caught another announcement from our good friends, the Oakland *Cloud Dusters.* Notably rubber men, this bunch has announced its First Annual 1/2A Free Flight Team Contest. Entries 50c per man and the price includes a free lunch—enjoy that part too. Prizes: large perpetual trophy and four individual permanent trophies for the team with the highest total duration. Suggest any of you clubs that would like to go for a deal like this drop Hal Roth of 2224 Grant St., Berkeley 3, California, a letter.

* * *

Up Northern California way, the 1/2A Stunt Events at the various contests are becoming more and more popular. Seems that there are a few other events for the smaller engines that are gaining in popularity such as 180 lap races, combat flying, etc. Due to the increase in popularity, it was felt by the Northern Clubs that modelers should build separate ships for these different categories. The events were dragging out a bit in time because of minor repairs, etc., on the single ship. A point here was that the modeler is encouraged to build specific models for each event and would thereby make a better competitive show.

* * *

The Western Associated Modelers' program for 1953 includes holding schools on stunt judging, speed timing, and pit management. The *Peninsula Prop Twisters* would like to host a Judging School if it is possible to include a school on flying scale judging at the same time. We definitely believe in schools for the newer judges. Getting so some of the judges on the stunt bench can't tell a "bunt" from a "prang." Here's one that may catch on and will undoubtedly raise a cry of protest. In the W.A.M. minutes, Motion #37 adds the following to the WAM Flying Rules. "No model airplane may be entered in more than one event on any single day of flying in a WAM Sanctioned Contest." We like to quote rules and regulations from the WAM group as they are a well represented group of clubs that consistently compete with one another as well as other clubs. Most of the motions are passed very nearly unanimously either for or against. Looks as if the views are clear cut.

* * *

We were nosing around Lloyd Hunt's garage the other day and noticed a small Pulse Jet in the corner. The job has a single valve, stainless chamber and aluminum head. Measures 5/8" in diameter and is 8-1/2" long. Waiting to hear this one blast—will let you readers know how it works. Got quite interested in another test being run on a ducted fan (Torp. .049) with extension shaft swinging a plastic prop. Lloyd claimed he will get more thrust and said it can be used on a u-control or f.f. model. After scrutinizing it much closer, decided it amounted to a poor man's turbo prop job.

* * *

Question popped up the other evening at one of the club meetings on how to obtain an A.M.A. Charter or how to be recognized as an Official AMA Chapter. The Model Airplane Club and Chapter Manual, page eight states: "If chartered club status is desired, it will be necessary that at least ten members of the group be AMA members; if application is to be made for recognition as an Official AMA Chapter, at least 20 must have AMA membership. These may either be Leader grade or active (licensed flyer) members. Application for membership may be made at the same time as application for chartered club or chapter is made. At least one of those adults who apply for Leader membership, or who already have such membership, should apply for appointment as Contest Director, so that sanctioned competition can be held." Any club that wants a charter, contact the AMA Headquarters and ask for the booklet mentioned.

* * *

The *Skycats* of Salem, Oregon, believe in advertising. The club presented an interesting display in one of the downtown hobby shops and plenty of passersby took notice. At the recent Olympia Meet, the *Skycats* brought back a couple of first place "mugs." Larry Liljequist was the club hero. Officials were "on the ball" at this contest. Timers were stationed at two separated tables and when ready to fly, a contestant checked in at the nearest one and waited his turn for a timer. None of the usual searching and yelling. When the competition was over, the winning times were announced so any protests could be made. If no "beefs" showed up, the prizes were handed out quickly and everyone could go home. Nothing more discouraging than having to stand around for hours while prizes are matched to winners' names.

* * *

The *Polar Buzz Bugs,* one of the most active and largest clubs in the state of Minnesota, have a Ladies' Auxiliary in their club. These gals do plenty of work by assisting in many of the activities. At the time of writing, these modelers are planning for the Second Annual Winter Contest to be held on White Bear Lake. This *(Continued on page 49)*

CONRAD CONROD
By Bob Goodeen
WHY DON'T YOU GET RID OF THAT DUMB NEARSIGHTED POOCH CURLY - EITHER THAT, OR GET HIM GLASSES -
HE DON'T NEED NO GLASSES, I'M GONNA USE HIM TO RETRIEVE MY PLANE IN THE CONTEST TOMORROW
WUFF
C'MON CURLY - LET'S HAVE A COKE WHILE THAT LAST COAT OF WHITE DRIES -
15 MIN. LATER
THAT LITTLE BABY OUGHTA REALLY CLEAN UP IN "A" SPEED TOMOR - MY PLANE!
BUT CONNIE - IT DID LOOK A LITTLE LIKE A BONE -
SHUT UP AN' DIG
WUFF

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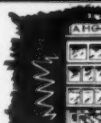

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O.K. Cub .049 Pkge.	(AA)	7.75
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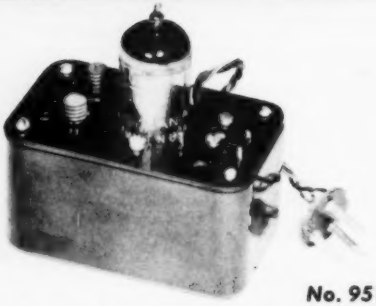

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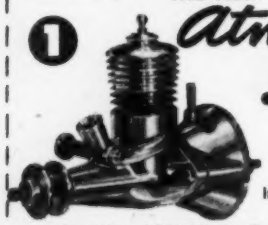

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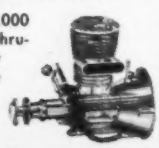

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Man At Work

(Continued from page 2)

▸ Better than a year ago, asked Ray Matthews, he of the *Fubars* and *Crowbars*, to write a comprehensive (but keep it short, Ray!) article on free flight. Contestwise vets may know these things—though we'll bet a few poised eyebrows will be seen to flicker—but most of us have to find out the hard way, if we last long enough, before we can win anything without the help of a benign thermal. Eight months ago, Ray's short article—10,000 words—arrived. Over the next three months, four different illustrators locked horns with the formidable job of outlining the drawings, and finally, Paul Del Gatto said yeah, he could do it without giving up modeling himself. Part one, the first of three, leads off this issue on page 11. By the time Ray winds up this discussion in the May issue, we should be ready to beat out the experts' brains this summer.

▸ What this country needs is a good sport free flight model. But we've about given up on this because no one who designs contest free flight is ever going to make a decent sport job. Trouble is that the so-called sportsters still go all out for performance, the rapid climb, and the thermal flight. These are just inferior contest jobs. This was brought home to us with a bang after test flying a new rc job. This ship spans 54 inches, weighs three pounds, 11 ounces, and has a Cub 14 with a Walker pressure tank. Incidentally, found that the narrow bladed Power Prop (9 x 6) gave this particular ship much snappier performance than the popular (in radio) Top Flite. Using a Bonner compound escapement and elevators, this ship does wild near-vertical dives, Zilchlike loops, and even flew inverted for brief intervals. Point is that 18 ounce wing loading and a 400 ounce power loading gave a fast moving ship that undoubtedly would make for a realistic, still peppy, sport free flight. Few free flight men have any conception of what an airplane can do when it flies on its wings instead of the prop.

▸ Couple of the high school men took over the basement for a go at yo-yo flying. Such activity. Old man's rc jobs got hung up out of the way. Torps, Foxes, Macs, a 23, a Mohawk, even a Clipper 30, running all the time. Fuel on the floor, exhaust smoke all through the house. Mad construction, still madder flying. Pieces and repairs. Flying at dawn. Reminds us forcefully of the educational job we all should be doing. Average modeler isn't aware of the importance of tip weights, balances, offsets, tank position, and so on, in U-control. Ships come in on the lines, lean out inverted. Profiles the big deal here. But the guys put the tanks on the inside of the profile—run rich, or on the outside with cross over feed line so engines cut in the air. Pushrods bend under air loads and don't give control. One chap forgot the overflow and closed it in, ruining a brand new Fireball in one session. Raw fuel ran out in wings, due to centrifugal force, and all the way to the tail. Upwind stunts and stuff. But the guys catch on fast. Let's spread that info around.

▸ Got three terrific ships coming up in April issue. Harry Williamson, who does Design Detail, and is one of our most active U-controllers, comes through with a really hot, good looking, big-engined biplane. If you have never built a "bipe," owe yourself a try at this one. Since the British have a world of experience with high-climb variety FAI jobs, had Pete Chinn—his brother John is a wheel in free flight—design a swell .15 pylon. It's a really professional job, one of the finest plans MAN has had the pleasure of publishing. Rubber fans will go for Hofmeister's *One-One-One*, a geared Wakefield that won its semi-finals, then final eliminations, and was number one U. S. job in Sweden in 1951. END

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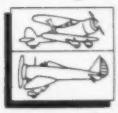

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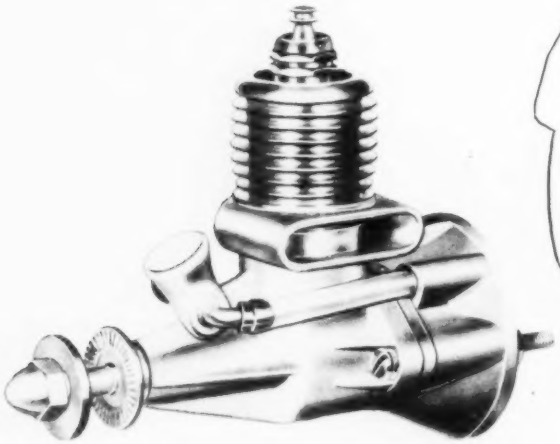

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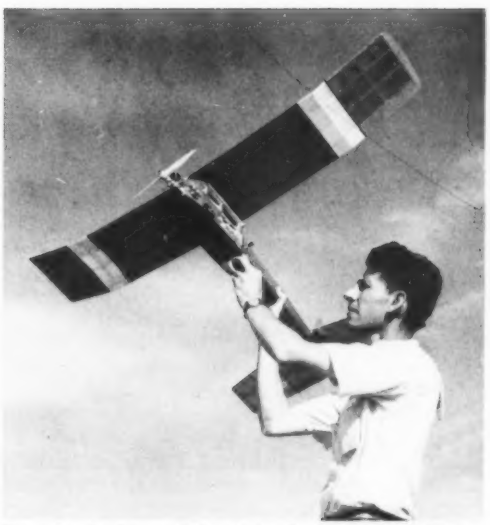
by RAY MATTHEWS

Carl Goldberg, pioneer of the pylon, puts down *Cumulus* for a Nats take-off.



The author checks one of his winning Crowbar payload designs.

Don Lutz pulls the timer before releasing for r.o.g. his Arden powered Zeke.

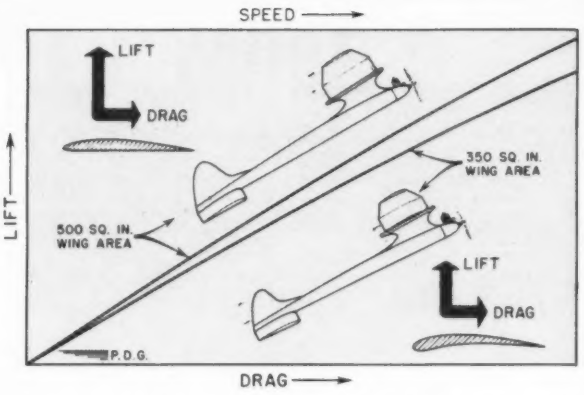
At British Nats, contestant hand-launched original with *Sailplane* surfaces.

▶ In outlining the requirements my ships had to meet this year, I decided that each model must: 1—be capable of six to seven minutes in dead air; 2—be 100 percent consistent; 3—be easy to adjust with no tricky warps or twists to make it fly; 4—fly equally well in calm or wind; 5—be easy to build; 6—be easy to repair and maintain; 7—have a good working dethermalizer; 8—have foolproof mechanical gadgets.

Let's talk about general design. Generally speaking, a small ship climbs faster than a large one if the same power is used, and the large one usually glides better, so what shall it be, all climb and no glide, or all glide and no climb? In attempting to find this unknown quantity of "size", I have flown "19" jobs from 230 sq. in. wing area up to 700 sq. in., and "29" jobs from 400 sq. in. to near 1,000 sq. in. Here are some of the compromises I have made and why I made the changes I did.

The "19" job seems to be best around 500 sq. in., and the "29" job about 600 sq. in. The decision on these sizes was arrived at by the "cut and try" method. My older "19" jobs with undercambered wings of the 230 sq. in. size were hot, and hot doesn't necessarily mean a fast climb. Sure, these ships had a good climb, but they were not consistent. Strange as it may seem, the 230 jobs will not touch the 500 jobs in the climb or glide. The small ship spent too much time cutting "didos" going up and required drastic adjustments that resulted in absorbing a large part of the available

Good free flights usually "look right." Frank Hoffman r.o.g.'s an A job.



PERFORMANCE COMPARISON CHART

power. I decided to "clean the airplane up," that is, use flat bottom wings, slimmer fuselages, etc.

The flat wing doesn't lift as much weight per sq. ft. at the same air speed, but there is your answer. The flat wing is faster with the same thrust because drag is much less in most cases. I haven't any wind tunnel handy, but I believe my 500 sq. in. wing has much more lift at the same speed than that of a 350 sq. in. with undercamber.

The class A "19" job that I built for the 1951 Nationals varied from my 500 sq. in. idea a little. Knowing Texas weather, I knew that the thermals were likely to be high and the air near the ground would be rough and turbulent. I decided to sacrifice some of the glide performance for climb. The area of this ship was 430 sq. in. with the same length fuselage that is used on the 500 sq. in. ship. Unfortunately, the climb was only slightly improved and the glide was almost as good as the 500 in. airplane, adding up to practically the same airplane.

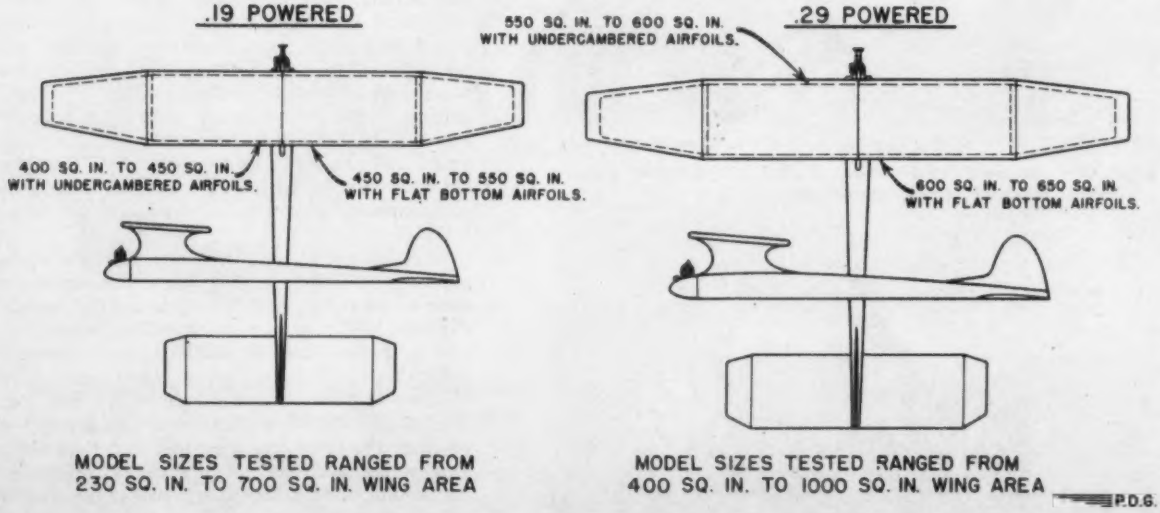
To sum up the size question, it is my belief that the wing area for "19" jobs with flat bottoms should be 450 to 550 sq. in. If an undercambered wing is used, I would suggest wings of 400 to 450 sq. in. Class B jobs seem to be best around 600 to 650 sq. in. for flat wings and slightly less for the undercamber jobs.

How much stabilizer area? In the past, a stab area of 33 percent of the wing was considered by many to be the best. However, now with higher powered engines and high performance airplanes to go with these "hot" engines, the stab must be larger. I don't know an exact proportion because there are too many other variables that enter into stab-wing relationships. My stab area is 43 to 44 percent of the wing and is going to be a little larger.

The next point to consider is "force arrangement," and here the variables are almost too numerous to mention. Why a stab of 43 or 50 percent, or why any stab at all? Did you ever see a model in flight when the stab came off? You probably saw a quick series of very tight loops, if they could be called loops. What is wrong with this model (after stab comes loose)? Sounds like a moron joke, but it's an exaggerated example of not enough stab. Now let's ride this horse backwards. The wing comes off; yes, we know, "rotten rubber bands", but that's not what I mean. What I have in mind is that the model has no tendency to pick its nose up, and the faster it goes, the more certain it is not to lift its nose. Now what's wrong? I am trying to show an extreme case of too much stab. Now that two good models have been "cracked up" for the sake of research, let's

BEST MODEL SIZE RANGE

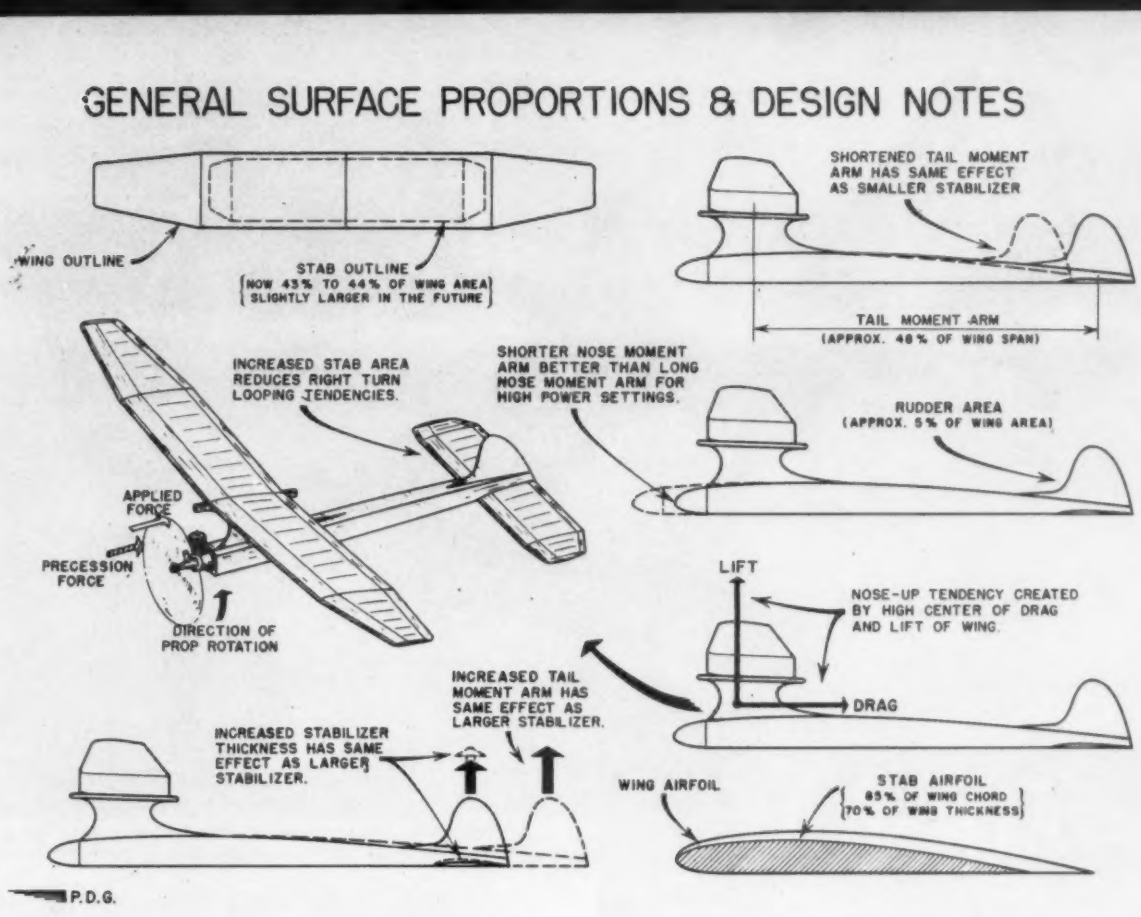
(DETERMINED THROUGH ACTUAL FLIGHT TESTS)


.19 POWERED
550 SQ. IN. TO 600 SQ. IN. WITH UNDERCAMBERED AIRFOILS.
.29 POWERED
400 SQ. IN. TO 450 SQ. IN. WITH UNDERCAMBERED AIRFOILS.
450 SQ. IN. TO 550 SQ. IN. WITH FLAT BOTTOM AIRFOILS.
600 SQ. IN. TO 650 SQ. IN. WITH FLAT BOTTOM AIRFOILS.

MODEL SIZES TESTED RANGED FROM 230 SQ. IN. TO 700 SQ. IN. WING AREA

MODEL SIZES TESTED RANGED FROM 400 SQ. IN. TO 1000 SQ. IN. WING AREA

P.D.G.


GENERAL SURFACE PROPORTIONS & DESIGN NOTES
WING OUTLINE
STAB OUTLINE
(NOW 43% TO 44% OF WING AREA)
(SLIGHTLY LARGER IN THE FUTURE)
SHORTENED TAIL MOMENT ARM HAS SAME EFFECT AS SMALLER STABILIZER
TAIL MOMENT ARM
(APPROX. 48% OF WING SPAN)
INCREASED STAB AREA REDUCES RIGHT TURN LOOPING TENDENCIES.
SHORTER NOSE MOMENT ARM BETTER THAN LONG NOSE MOMENT ARM FOR HIGH POWER SETTINGS.
RUDDER AREA
(APPROX. 5% OF WING AREA)
APPLIED FORCE
PRECESSION FORCE
DIRECTION OF PROP ROTATION
LIFT
NOSE-UP TENDENCY CREATED BY HIGH CENTER OF DRAG AND LIFT OF WING.
DRAG
INCREASED TAIL MOMENT ARM HAS SAME EFFECT AS LARGER STABILIZER.
INCREASED STABILIZER THICKNESS HAS SAME EFFECT AS LARGER STABILIZER.
WING AIRFOIL
STAB AIRFOIL
(85% OF WING CHORD)
(70% OF WING THICKNESS)
P.D.G.

examine a more practical application of too much or not enough stab.

Let's imagine a model with a very small stab! We are going to fly this ship and then put on a slightly larger stab and fly it again and so on, until the stab is almost the size of the wing. In order for this theoretical experiment to work, we must keep all other factors in this model constant; that is, power, incidence, CG location, etc., will remain the same. Well, here goes the small stab job (let's assume it's a pylon job) up in what could be called a looping climb to the right and maybe developing into a spiral dive. With each flight thereafter gradually increasing stab areas, you will notice that the right turn tendency and the looping tendency lessens each time we increase the stab area until a point is reached where the model probably will not climb at all, and a left turn under power begins to appear. Why does the stab area cause these effects? When a force causes the nose of the model to go up, that gyro on the front of your plane which is called a propeller tries to turn the ship to the right. The more definite the nose up force is, the more the gyro turns the ship. By adding stab area, the nose-up force is reduced, and the plane climbs at a lesser angle of attack or, if you prefer, a flatter, faster climb with less gyroscopic precession, and decreases the right turn tendency.

You may want to throw torque into the picture which is fitting; stab area also has an effect on torque reaction, but let's wait a little! Torque reaction and many other things will be nailed down in the adjustment part of this discussion. It was from experiments such as these mentioned that my stab area came out to be 43 to 44 percent of the wing area; however, I would like to go to about 48 percent and remove some of the downthrust that I am forced to use.

How large should the rudder be? In my opinion, rudder area would be the toughest calculation to make exactly right as dihedral, aspect ratio, location of rudder, rudder airfoil, airflow around the fuselage, and many other factors come into the picture. The way I arrive at my rudder sizes is to build them about five percent as big as the wing and let it go at that. Too large rudders tend to cause spiral dives in the glide and power too. Too small rudders usually cause a "hunting" in the climb, with a very inconsistent turn in the glide, becoming very unstable in a thermal. The length of the tail moment has an effect on both stab and rudder areas. The tail moment arm used on my ships is 48 percent of the wing span. This measurement is taken from center of wing to center of stabilizer. This figure will not hold true for wings of all shapes and aspect ratios. The tail moment can be longer; however, recovery after engine "cuts" is usually slower; or it can be shorter with more of an unstable climb. Shortening of the moment arm is first cousin to using a smaller stabilizer. Of nose moment, all I can say is make it as short as possible and still maintain the CG location best suited for your force arrangement. Long nose moments are difficult to adjust for high powers, and there is too much difference between half power and full power flights.

We cannot consider any set of proportions as being the ideal setup. Such data just isn't available, nor can it be mathematically calculated to any degree of accuracy. Sure I could set down long, involved formulas that we use in large aircraft design, but it would be worthless to the average model builder. It also has been proven time and time again that the best aeronautical minds in the country can't design a model that will perform as well as a good modeler with a few years' experience using the "rule of thumb." *(Continued on page 38)*

AIR WAYS

INSPIRING QUALITY DISTINGUISHES THIS MONTH'S COLLECTION

Corsair, *Hellcat*, Ray Carlin, Philly, have folding wings; *Hellcat*, *Fury* working brake flaps, hooks, navigation lights. *Fury* ailerons moveable.

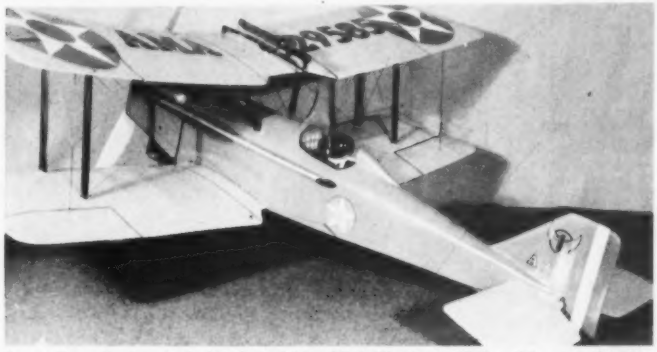
Built by Jimmy Sekiguchi, Yokosuka, Japan, Lockheed F-90, made from aluminum, does 80 mph on M.E.W. 707 rocket engine. Span 17 in., length 23.

Four *Wasps* for power, planked and sheeted, is this 45 in. Douglas *DC-7*, in United's colors. Flies well on three engines. By W. R. Linke, Seattle.

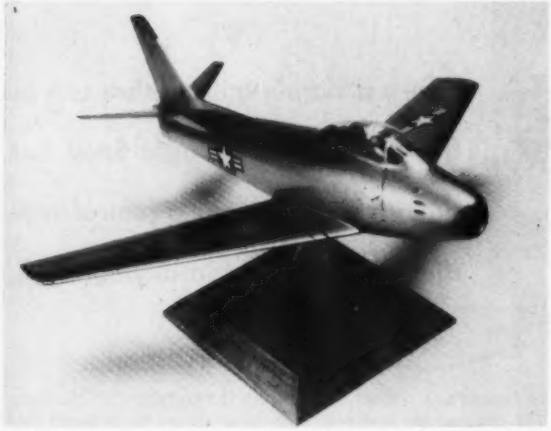
Jerry Thomas, Tacoma *Airmuddlers Club*, displays new look in Wakefields. Ship was one eliminations winner in '52. Note retractable take-off gear.

Ron Adams, London, who sent shot of B. Chivers launching a scale free flight Bristol *Scout*, says that it flies steadily.

Typical of the many remarkable Fokker *D-7*'s built from the Nieto plans (Aug., Sept. 51 MAN), is this realistic 22-ounce job for a Fox 35! Every detail is incorporated.



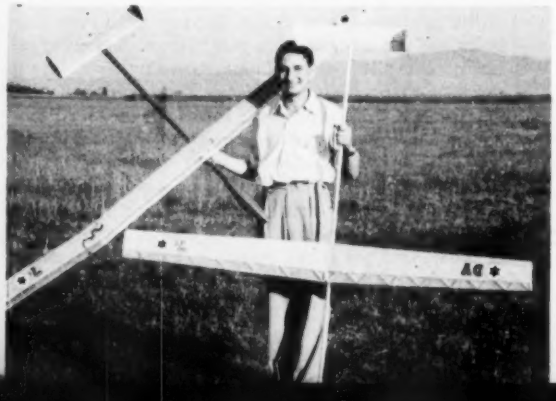
James Dare, Boston, took this shot of friend Bob Warring's *SE-5*, a 37-ounce ship for a *Super Cyke*. Model was built according to Wylam drawings. Design good for stunts.



Satin sheen, sprayed silver finish is appropriate finishing touch for neat 12-1/2 in. *Sabre*, constructed by Phil Landray, Wimbledon, Eng. Living in Switzerland, Arthur Guttman of Israel attended World Glider Championships at Graz, Austria. Note "toothpick" fuselage design.

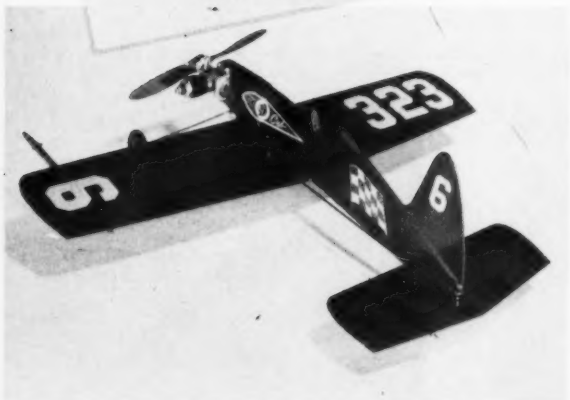
Frank Lees, Lancaster, Eng., is proud of this 63 in. span Luscombe *Silvaire*. Power is Mills 1.3 cc diesel. Gear, wings and struts are rubber mounted.

Another British flying scale, this time a DH *Moth*, F. Andersan, N. Kent, Club. Features full length pilot and complete instrument panel, E. D. Bee.



the Sidewinder

Installation of the single line conspicuous in this photo. Note the elevator locking wire in place.



Details of the elevator system shown here. Position of the bellcrank — which is under left wing — is indicated by the bolt head on top of wing.

by PETER FRANKLIN

▼

Here's a simple quickie that can be flown either by a single fixed line or with elevators and a control handle as usual. For fun or beginners.

▶ Every year, new modelers are introduced to plane building. It is important that these people have success with their first model if they are to continue with this hobby of ours.

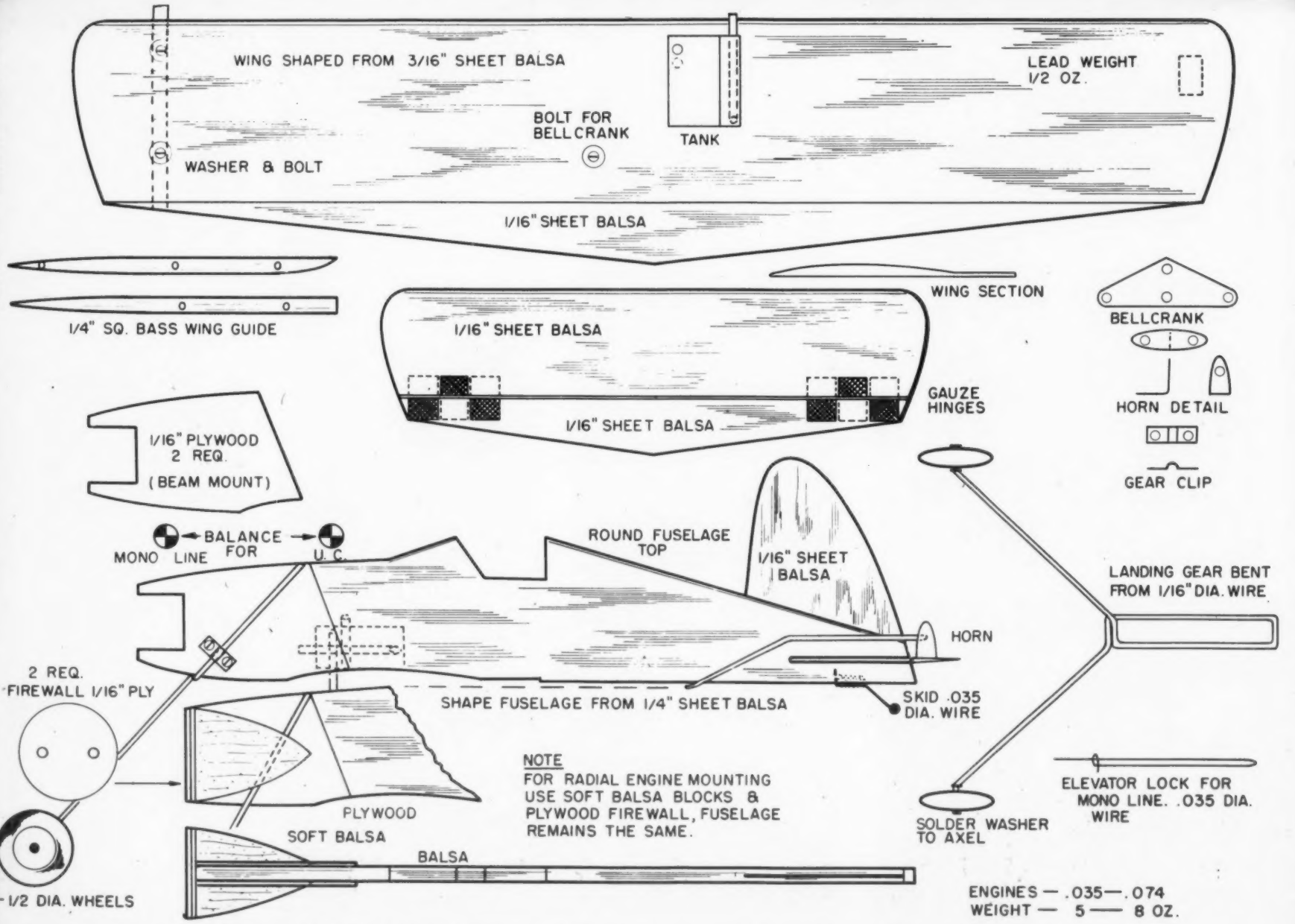
The *Sidewinder* guarantees the beginner will get his first model in the air for, with locked controls and a single line, he can control the height of the model by raising his hand with the handle to make the ship climb and by lowering to allow it to land. By flying the model around and around, stepping back when the line gets a little slack, and keeping up with the model as it flies, he will get valuable training. It is good to have these things under the belt when a U-control handle and movable elevators are used.

The landing gear is placed well forward so that the model will run on the ground until the flier has confidence; then, a little up elevator is given and the model lifts off slowly. It will not take off in the usual loop, due to over control.

Be sure to check balance point for the control system used as it differs. The ship in the picture employs beam mounting; however, the plan shows both beam and radial mounts.

Cut fuselage from balsa stock specified on the plan and, depending on how engine will mount, alter nose to suit. Bend gear as shown to go around the lower part of the fuselage, as well as over the top. Drill mounting holes and mount gear with gear clamps. Solder wheel retainers in place, or use Pylon Brand nylon retainers, checking that wheels roll freely. Starting at the top of the fuselage at the windshield, round edges toward rear.

Cut wing from specified stock and sand in airfoil cross section shown on plan. Add 1/16" sheet stock to the wing trailing edge to obtain taper. Drill four holes as shown and cement wing in place. If model is to be flown with one line, wing guide is cut from bass or other hard wood and bolted in place. Use washers on the top of the wing to prevent bolts from coming through. If model is to be flown in the usual U-control manner, horn and bell *(Continued on page 39)*

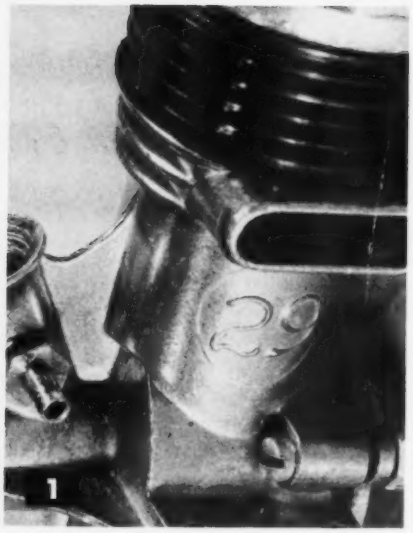


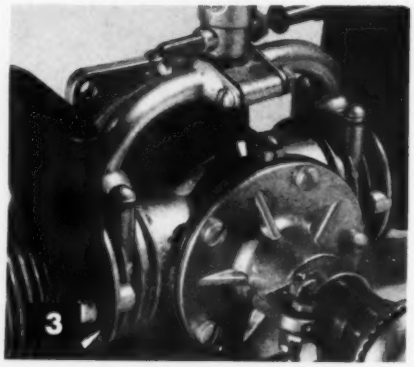
FULL SIZE PLANS FOR BOTH "SIDEWINDER" AND "LONG TOM 60" AVAILABLE. SEE PAGE 52.

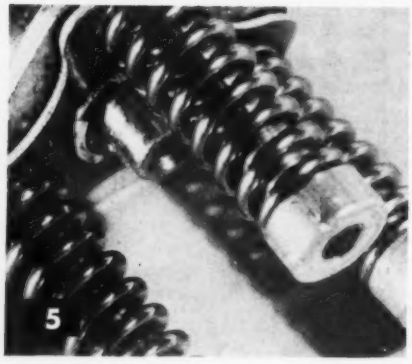
know your engines?

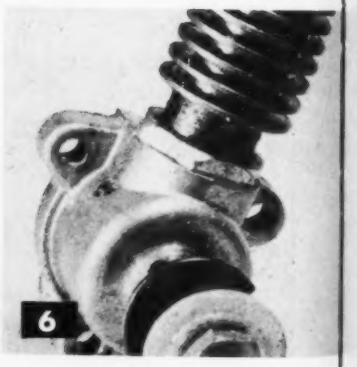
by ARTHUR SILBERBERG

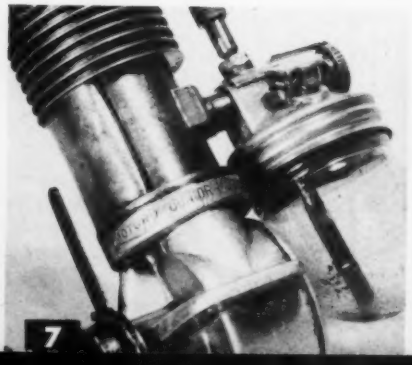
Guess at, eh, name the assorted engines, then check your score with the list below. Eighteen to 20 is super; 15-18 good; 10-12 so-so; 0-10, demand a recount.

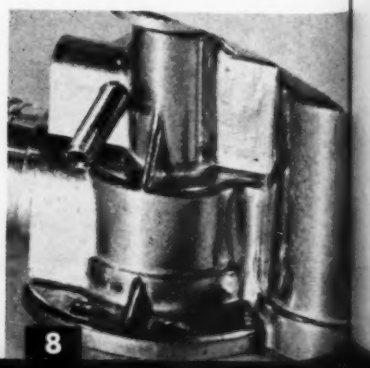






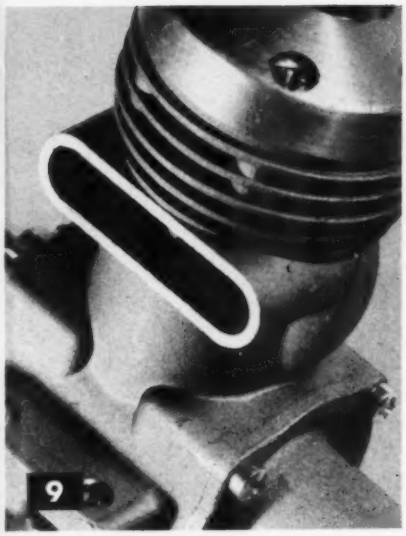






ANSWERS

1. Veco 29	8. Anderson Spitzy	15. Meteorlt 29
2. Cannon 29	9. Dooling 29	16. Baby Mac
3. OK Twin	10. Elf Twin	17. Fox 29
4. OK 60	11. Atom	18. Pixky 19
5. Jetex 100	12. Forster 99	19. Viking 65
6. CO2	13. Atwood Champion	20. Kon 60
7. Brown Jr.	14. Arion Mercury	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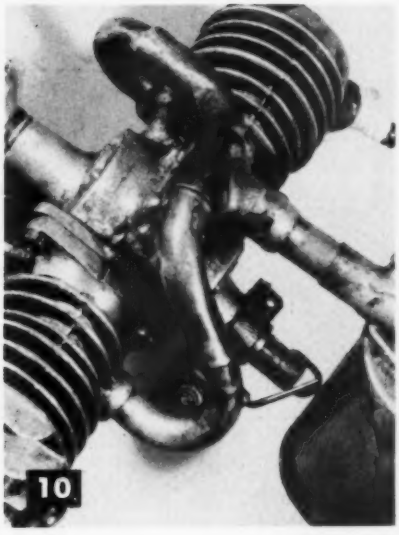
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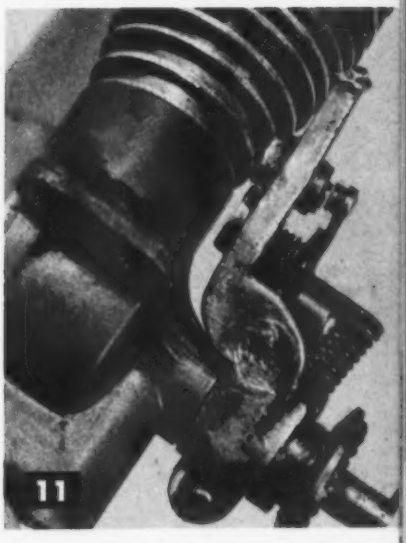
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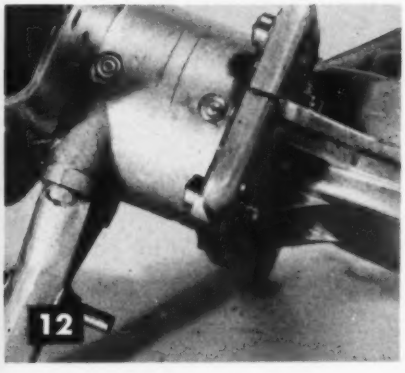
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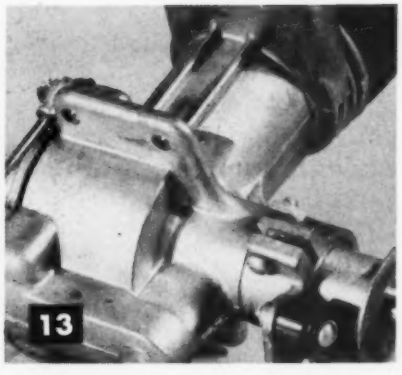
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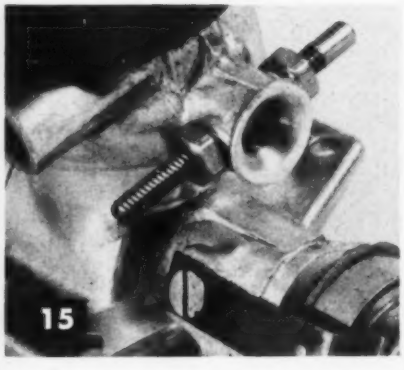
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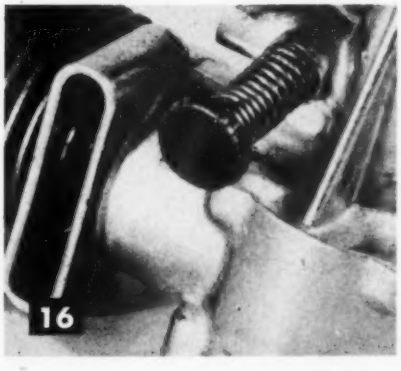
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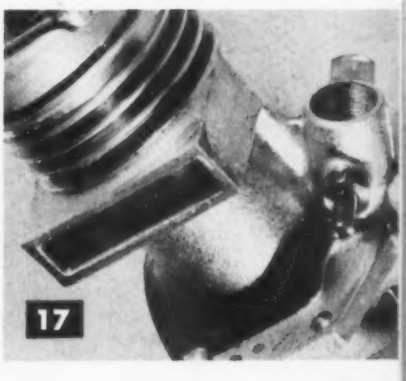
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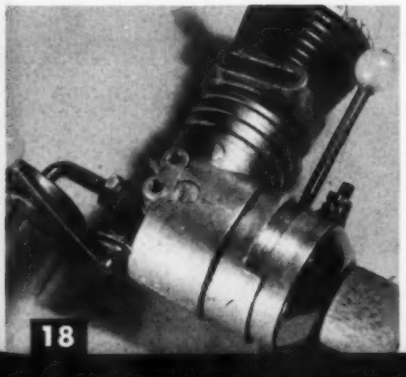
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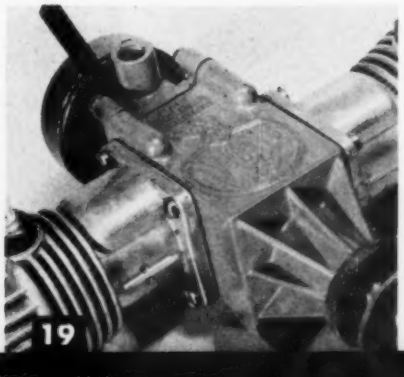
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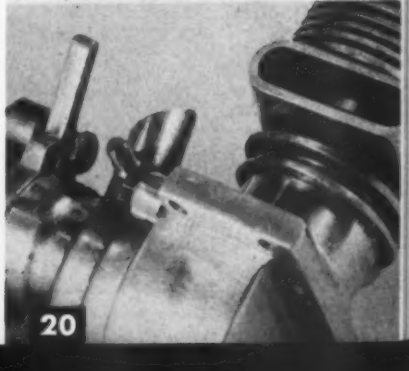
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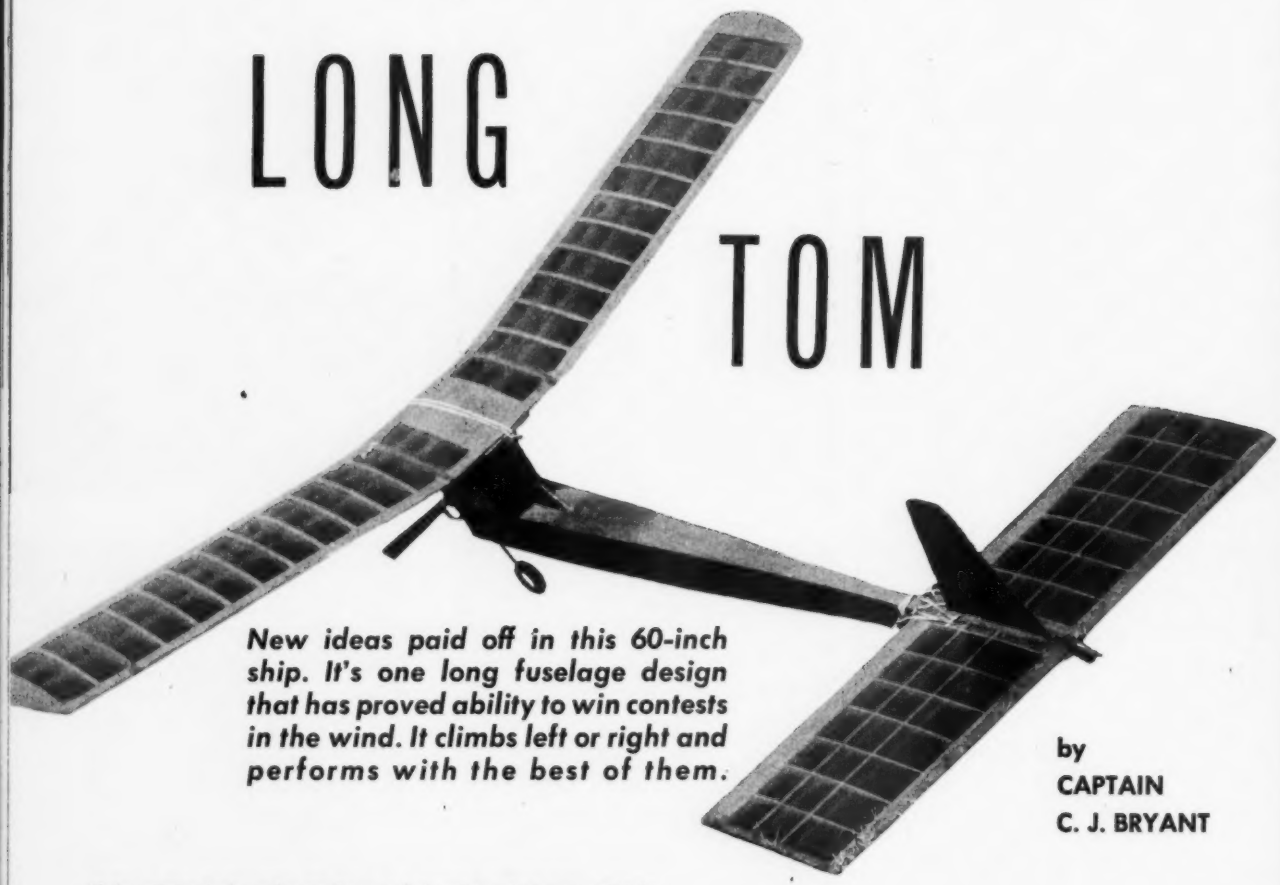
LONG TOM



New ideas paid off in this 60-inch ship. It's one long fuselage design that has proved ability to win contests in the wind. It climbs left or right and performs with the best of them.

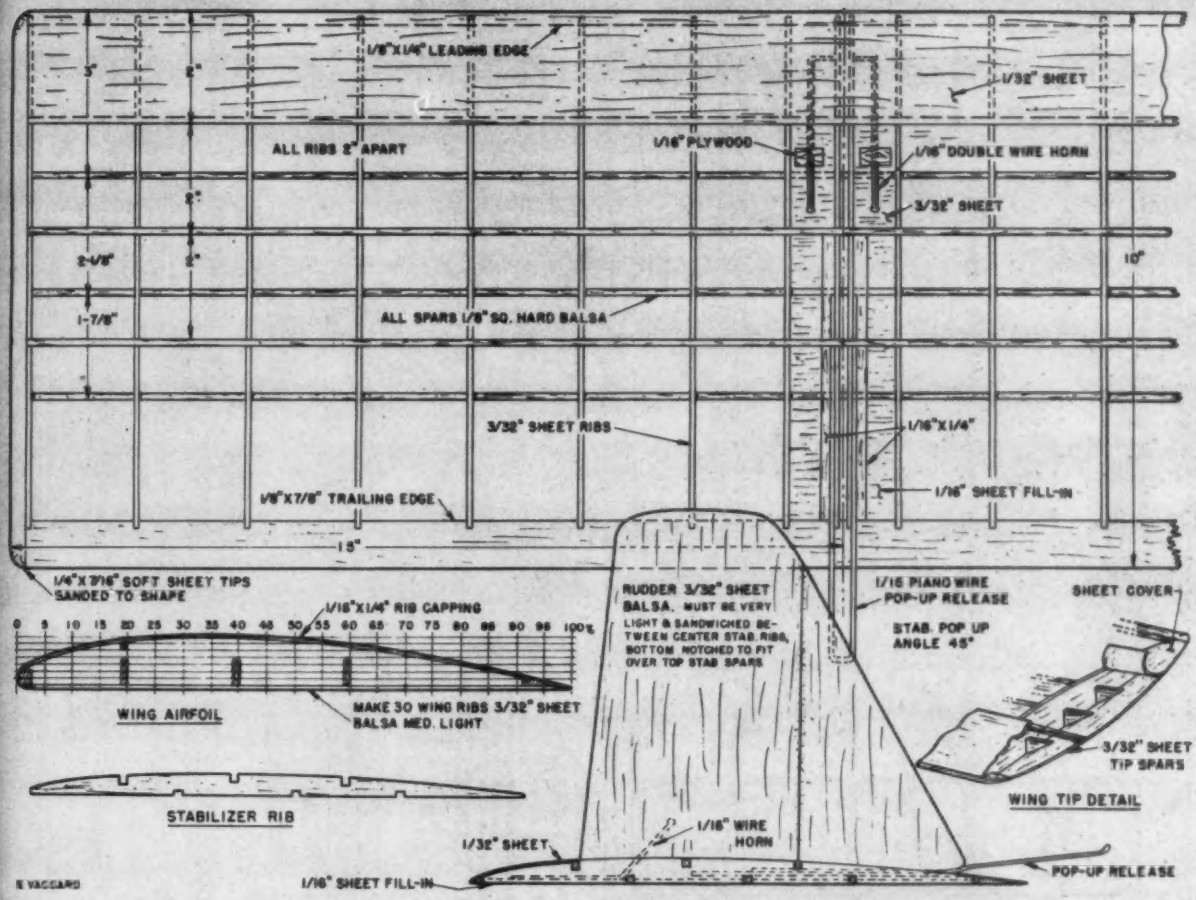
by CAPTAIN C. J. BRYANT

If the captain looks cocky, it's because he's got a potent crate. Straight lines, simple construction, make it a kind of "poor man's Civy Boy."

▶ The first *Long Tom* "60" flew in February 1952, right off the drawing board. Every *Long Tom* since then has done the same. The model is constructed by using the simplest methods possible, since my motto in building a contest model is ease of building and to heck with complex and elliptical curves which take up a lot of construction time. Ready to fly the ship weighs (with *Torp* 29 or 32) 32 to 33 oz. which is right on weight limits for that class. It will climb just as well to the right or to the left, but its best performance is when adjusted to climb straight ahead—and it goes up with speed. It has a flat, slow glide (in spite of the flat bottom wing section and thin tail section) to the left in 100-ft. circles.

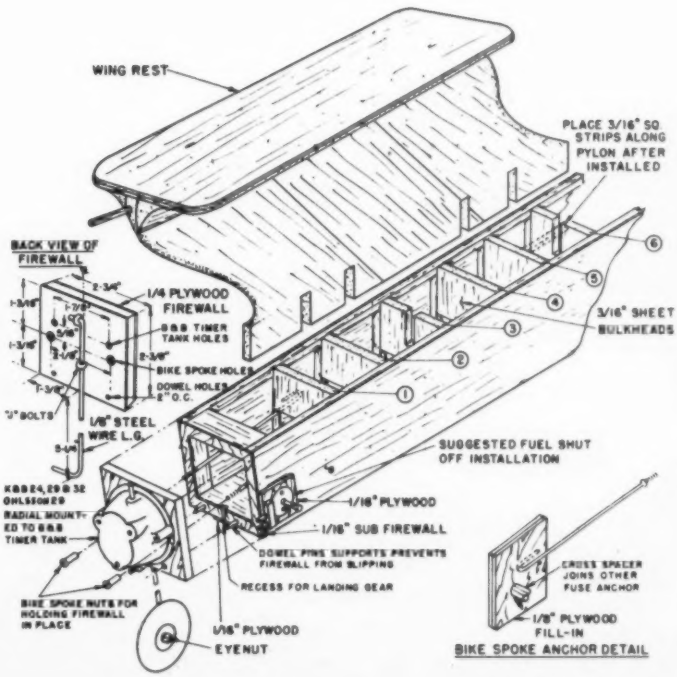
Many modelers believe that long tail arms do not fly in wind, but *Long Tom* took first in "A" and first in "B" Free Flight at the Air Force Southwest Conference meet in winds up to 25 to 30 mph. High time was eight min. 55 sec., since models would pass out of sight in a few minutes with winds that strong. In the class "C" event the timer valve stuck and I am still hunting for the model. The design also won first with a high time of 22:30, at the Texas Eagles Model Airplane Meet, all classes combined.

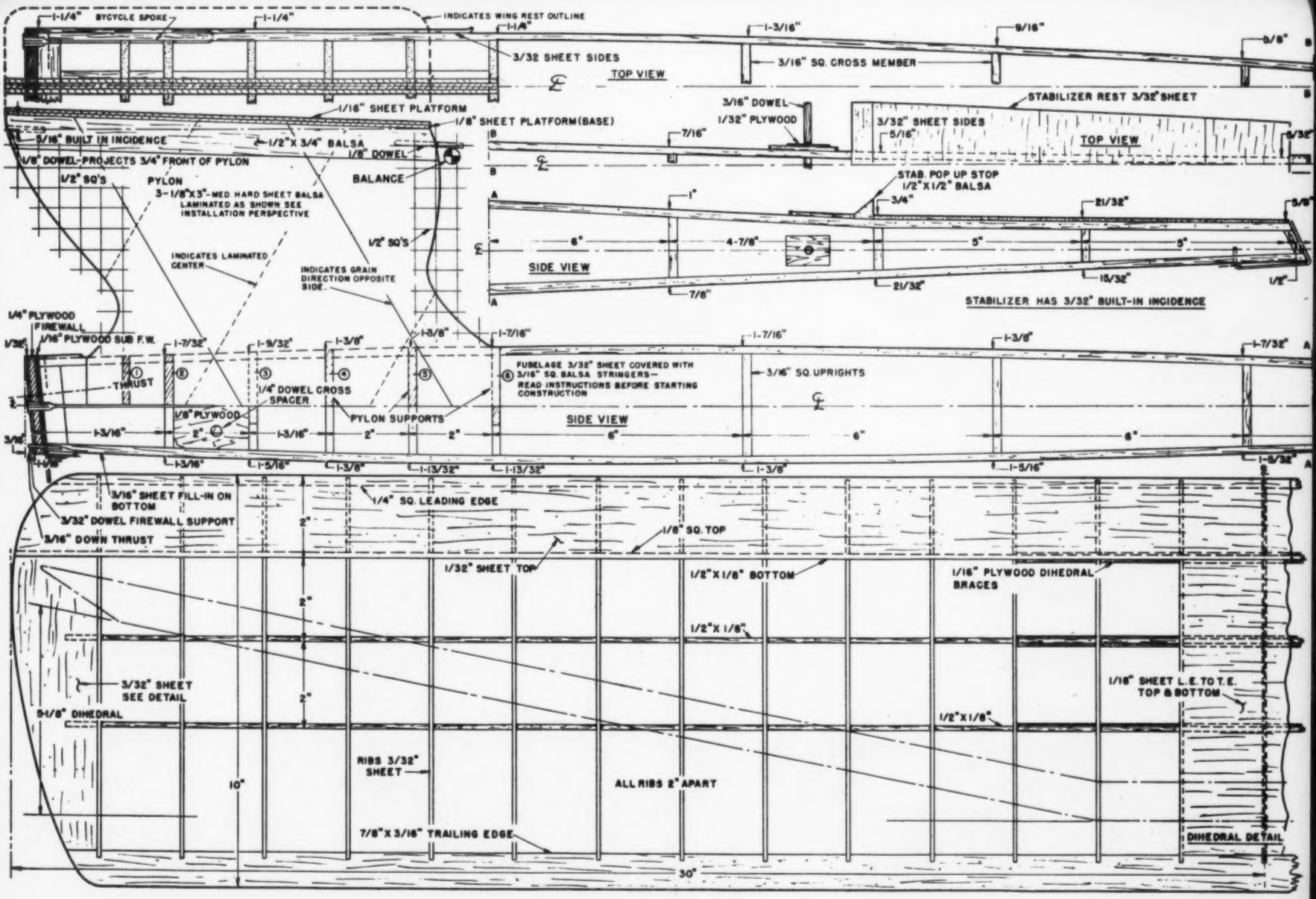
The wing section is of my own design and has high lift qualities, and at the same time slow gliding qualities. Stab is made as thin as possible without warping when covered. This is to take lift away from stab so that the tail won't go crazy and furnish too much lift letting the model get into a dangerous attitude for a crack-up. Poly dihedral was omitted because of added weight and loss of tip lift when the model gets a wing down, which usually results in a crack up. The long tail arm provides a model with a flat, slow, stable glide. So far I have



built five *Long Toms*, three "60's", two "56's" and all models are still flying, except the one lost. None have ever crashed. If you follow instructions for building and adjusting this model, you will have many contest wins ahead.

Select four sheets of 3/32" x 3" x 60" (splice fit, shorter lengths if necessary) of the finest quarter grain medium balsa of lightest possible weight. Lay out fuselage sides right on these sheets from dimensions given on plans. Next, select four 3/16" sq. x 56" stringers of hard balsa, cement them to sides and hold in place with straight pins. Cement uprights in place. When making second fuselage side, place it back to back with first side, cement stringers in place, then uprights. Now fill in 3/16" sheet balsa where indicated. The bike spokes anchor the fire wall in place. Drill a 1/16" hole in 1/8" plywood and fill in as indicated in plans. Insert your bike spoke in this hole and bend over as indicated in the perspective drawing. Next cement it firmly in place compressing it into fuselage side. Sand two sides back to back until they are even. Join fuselage sides together, cut out the pylon anchor bulkheads (3/16" sheet) as shown on plans and perspective drawing, and cement these to one fuselage side at their proper location (bulkheads 1, 2, 3, 4, 5, and 6). Cement second side to them. Next cement your 3/16" sq. cross members into place (using straight pins to hold in place). You are now ready to fill in nose section with 3/16" sheet balsa medium. Now construct *(Continued on page 47)*





FULL SIZE PLANS FOR BOTH "SIDEWINDER" AND "LONG TOM 60" AVAILABLE. SEE PAGE 52.

PLANES IN THE NEWS

Designed to shoot down targets at night or in any weather, the North American Sabre F-86D jets are our only one-man, all-rocket interceptors.

Here in flight over west coast mountain range, "D" is in production at company's Los Angeles plant. Nose radome is different earlier 86's.

by DAVID ANDERTON

Why the Swedish Saab-32 Lance jet is quite an airplane. Convair tests their flying boat fighter, using hydro skiis for take-off and for landing.

The Saab-32 *Lance* is the most handsome military aircraft to come along in many months. This new Swedish all-weather attack plane flew for the first time last November. It was designed by the Saab engineering staff, under Lars Brising and with Arthur Brasjo as project engineer, to specifications developed by the Royal Swedish Air Board.

From its black radome to lipped tailcone it is a rugged-looking fighting airplane. No dimensions, specifications or performance data are being made available right now. But just look at the lines and then judge for yourself.

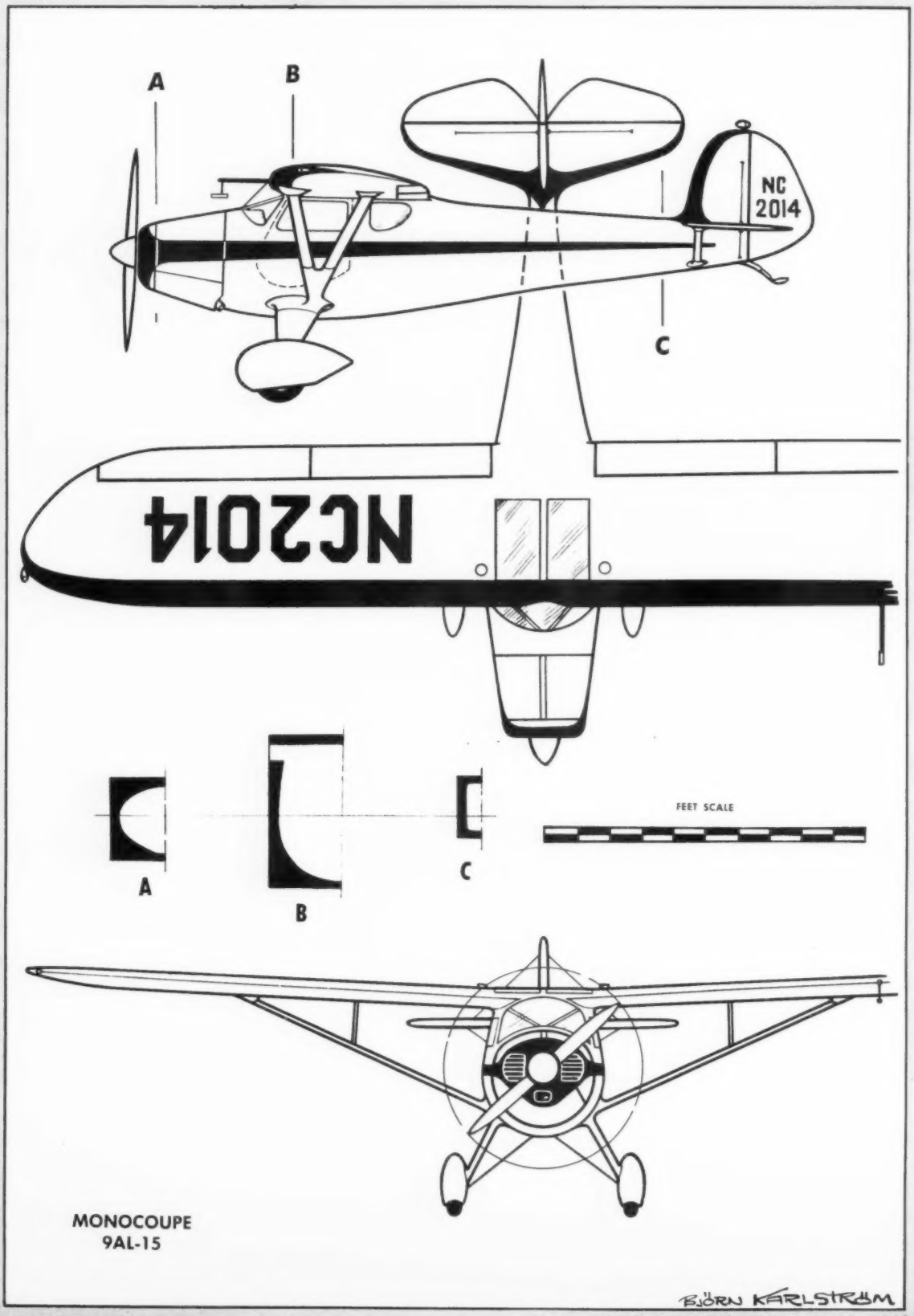
The Saab information on the plane says that it's bigger than the *J-29* (the flying barrel, as it has been called) and faster. Top speed, says Saab, is in the neighborhood of 700 mph. It makes this on the thrust of an undisclosed version of the British Rolls Royce *Avon* turbojet.

All surfaces are swept sharply–I'd estimate at about 35 deg.–and are of moderate aspect ratio. The wings are thin; trailing-edge Fowler flaps and leading edge slots are installed. Ailerons are hydraulically boosted. The sleek fuselage houses a crew of two in a roomy cockpit covered with a one-piece unbraced canopy. The cockpit is pressurized and ejector seats are used.

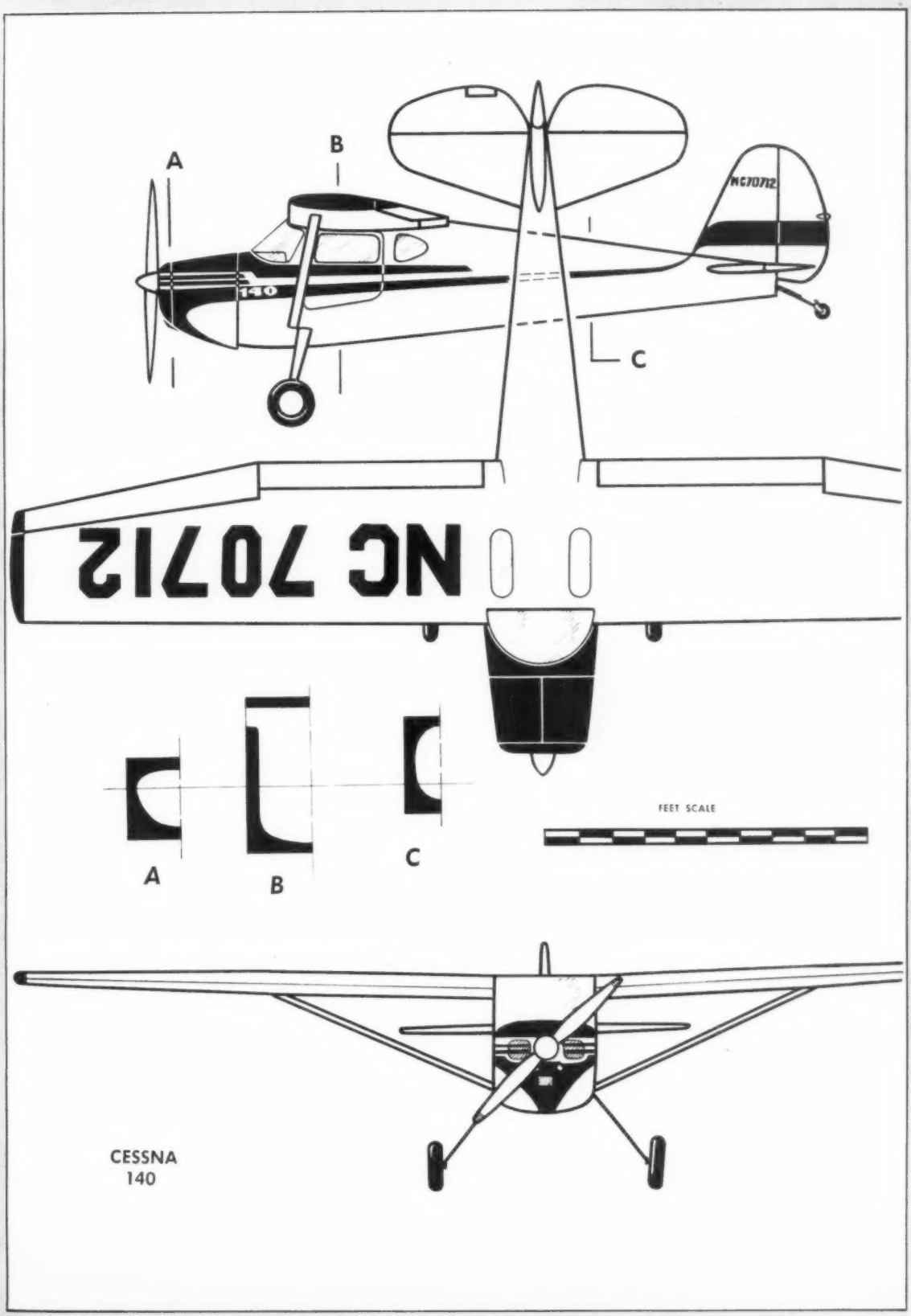
The radome nose is conventional, but as you look aft, the fuselage lines soon break into semi-flush inlets, certainly the smoothest aerodynamic design of the year. You just don't draw inlets like that, either—they are the result of much calculation and test work, and probably considerable cutting and trying on test models. The air can make an easy transition from the flow around the fuselage into those intakes. A dark slot just above and behind the inlet *(Continued on page 52)*

English approach to the all weather fighter is the unusual DeHaviland 110, twin boom, double-engined job powered by Rolls Royce Avon turbojets.

Picture shows the second prototype that was flown at the Farnborough exhibition. "Fence" is noticeable on leading edge close to near wingtip.


A
B
C
NC 2014
NC2014
A
B
C
FEET SCALE
MONOCOUPE
9AL-15
BJÖRN KARLSTRÖM

FOR SCALE



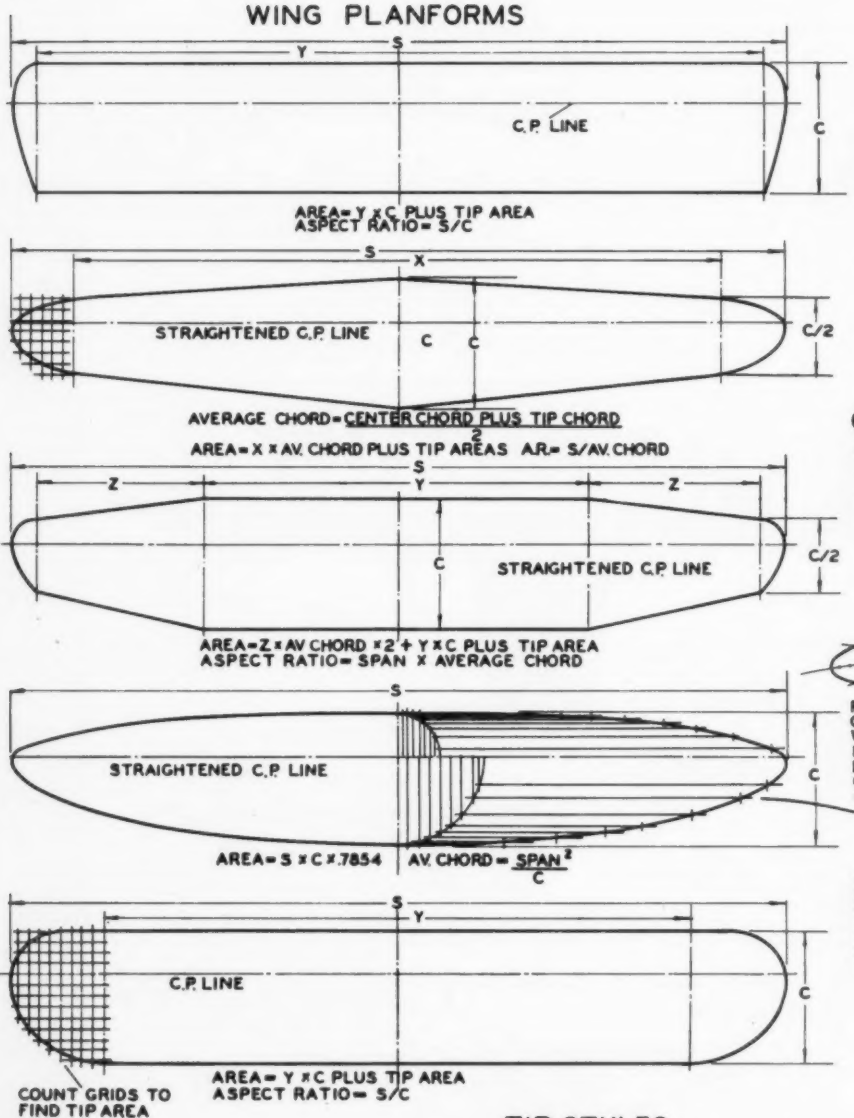
design detail

WINGS

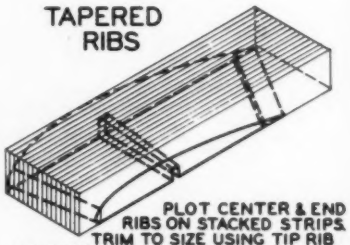
. . . by Harry Williamson

Models may fly without a tail or a fuselage but never without a wing. So don't consider the wing just a monotonous building chore. Good design counts.

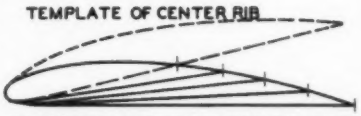
WING PLANFORMS



TAPERED RIBS



PLOT CENTER & END RIBS ON STACKED STRIPS. TRIM TO SIZE USING TIP RIB AS GUIDE. NOTCH FOR SPARS L.E. & T.E. REPEAT FOR OPPOSITE PANEL.

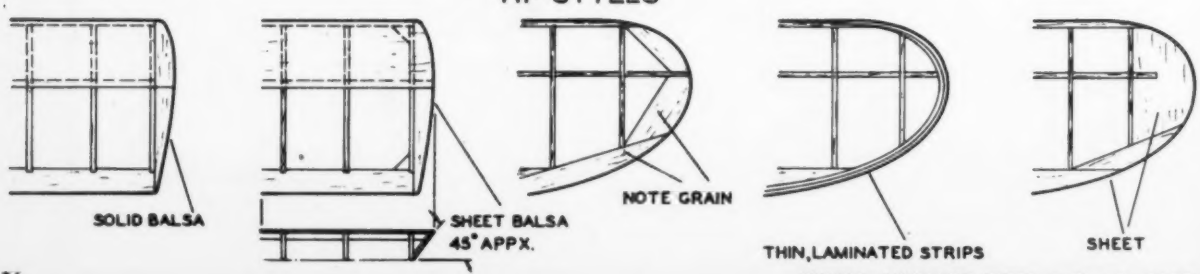


TRACE OUTLINE OF CENTER RIB, THEN MARK THE CHORD OF THE OTHERS ON THE UPPER CAMBER. ROTATE THE TEMPLATE UNTIL LOWER EDGE INTERSECTS AT THE POINTS MARKED. THEN TRACE LOWER EDGE.

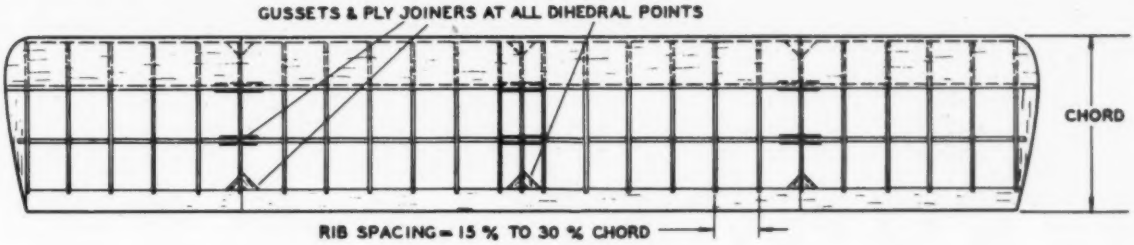
PLOT CENTER & TIP RIBS ALONG THE CAMBER LINE. CONNECT SIMILIAR POINTS WITH STRAIGHT LINES. DIVIDE THE LINES INTO A NO. OF EQUAL SPACES CORRESPONDING TO THE NO. OF RIBS REQ'D. CONNECT THE POINTS WITH A FRENCH CURVE.

SWING TWO ARCS FROM C.P. LINE TO L.E. AND T.E. DIVIDE EA. INTO A CONVENIENT NO. OF EQUAL SPACES. DIVIDE EA. WING PANEL INTO A LIKE NO. OF EQUAL SPACES. PROJECT OUT TOWARD TIP UNTIL LINES LINES INTERSECT. CONNECT POINTS WITH CURVED RULER.

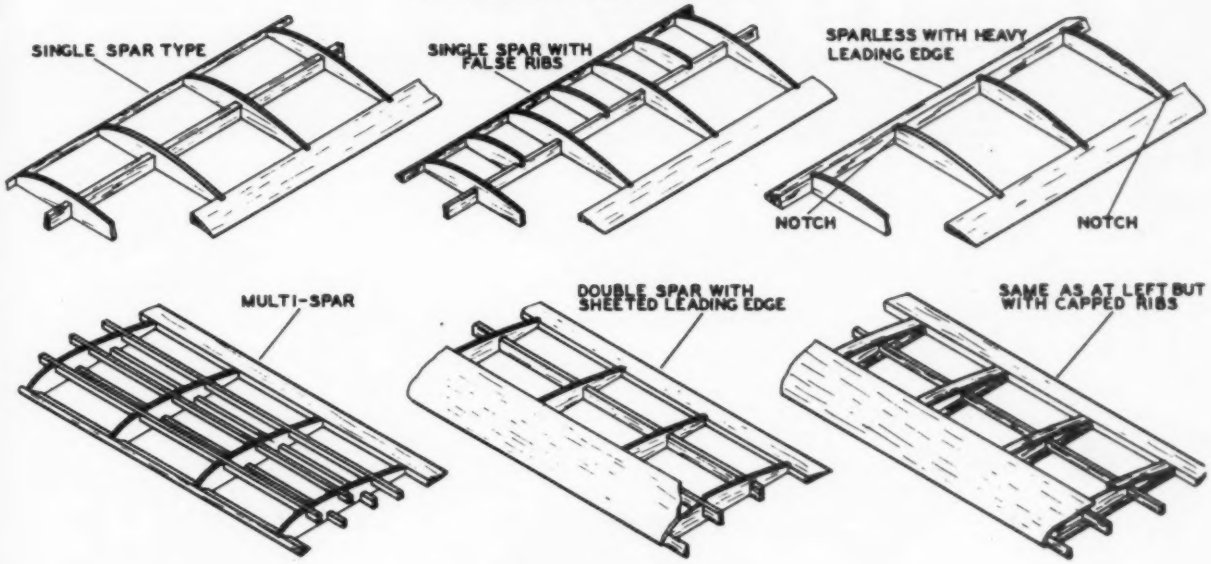
TIP STYLES

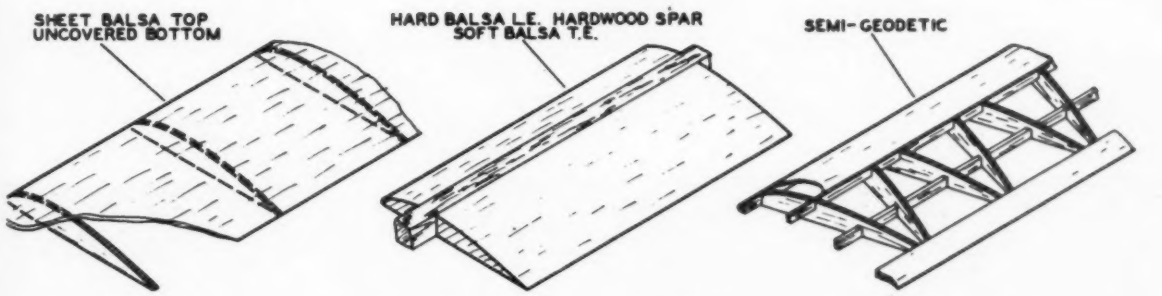


TYPICAL WING ARRANGEMENT

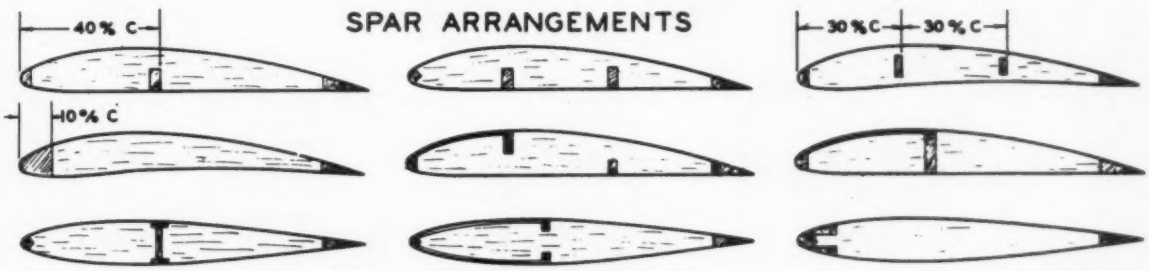


POPULAR WING TYPES

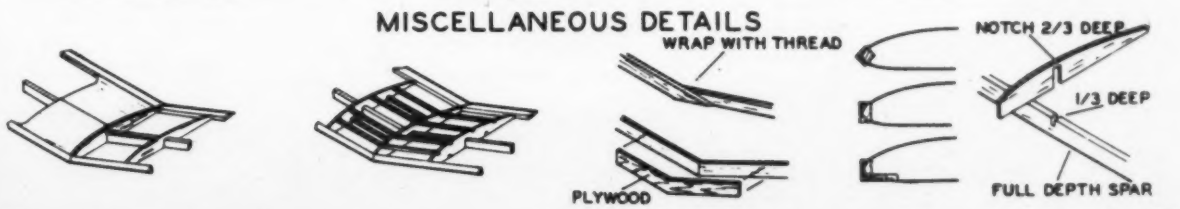




SPAR ARRANGEMENTS



MISCELLANEOUS DETAILS

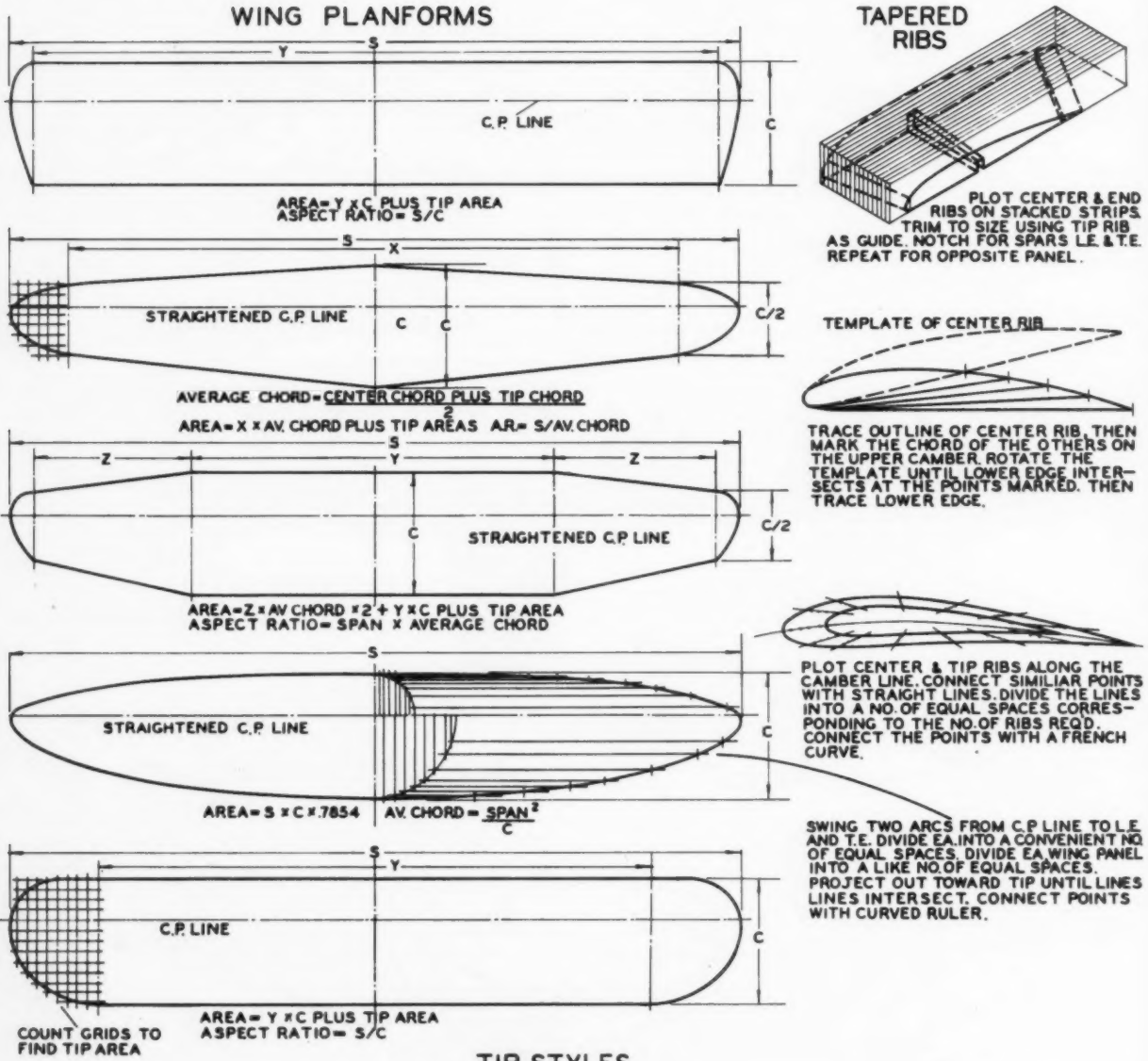


design detail

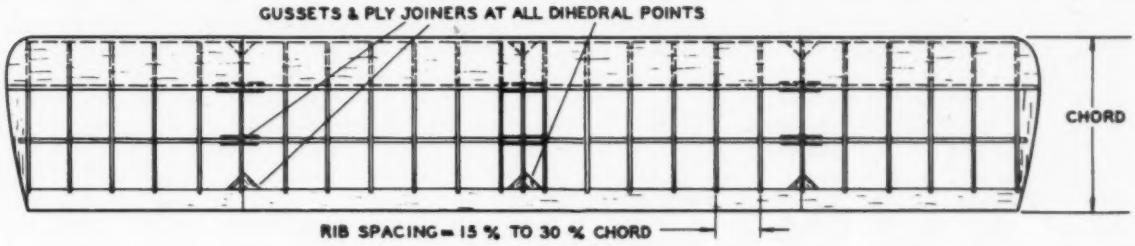
WINGS

. . . by Harry Williamson

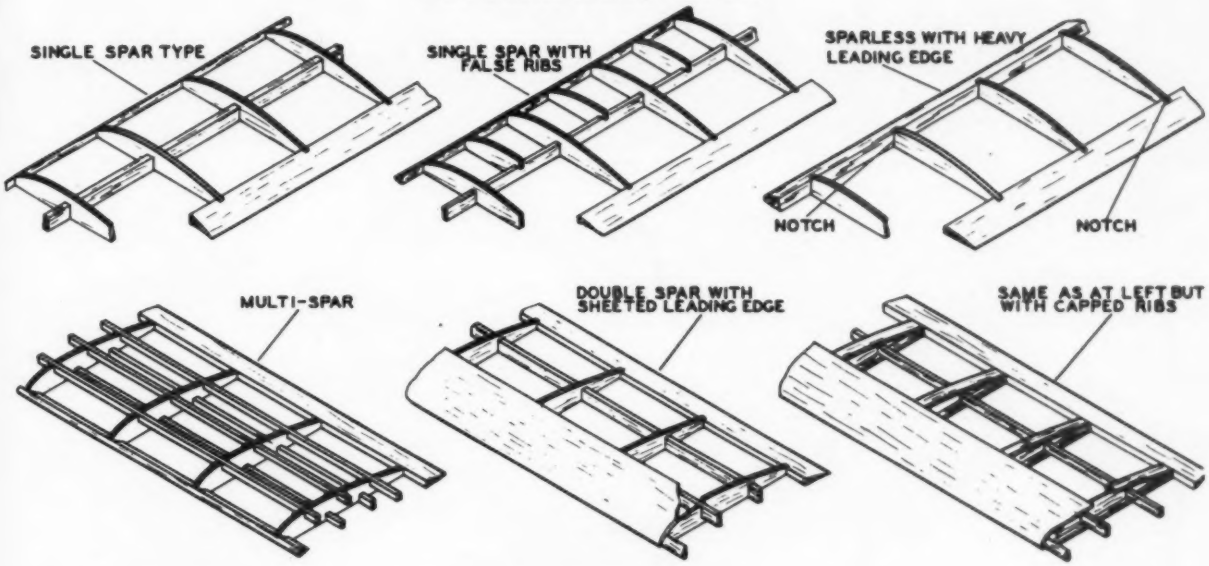
Models may fly without a tail or a fuselage but never without a wing. So don't consider the wing just a monotonous building chore. Good design counts.


WING PLANFORMS
Y
S
C.P. LINE
C
AREA = Y x C PLUS TIP AREA
ASPECT RATIO = S/C
S
X
STRAIGHTENED C.P. LINE
C
C
C/2
AVERAGE CHORD = CENTER CHORD PLUS TIP CHORD / 2
AREA = X x AV. CHORD PLUS TIP AREAS A.R. = S/AV. CHORD
S
Z
Y
Z
C
STRAIGHTENED C.P. LINE
C/2
AREA = Z x AV CHORD x 2 + Y x C PLUS TIP AREA
ASPECT RATIO = SPAN x AVERAGE CHORD
S
STRAIGHTENED C.P. LINE
C
AREA = S x C x .7854
AV. CHORD = SPAN² / C
S
Y
C.P. LINE
C
COUNT GRIDS TO FIND TIP AREA
AREA = Y x C PLUS TIP AREA
ASPECT RATIO = S/C
TAPERED RIBS
PLOT CENTER & END RIBS ON STACKED STRIPS. TRIM TO SIZE USING TIP RIB AS GUIDE. NOTCH FOR SPARS L.E. & T.E. REPEAT FOR OPPOSITE PANEL.
TEMPLATE OF CENTER RIB
TRACE OUTLINE OF CENTER RIB, THEN MARK THE CHORD OF THE OTHERS ON THE UPPER CAMBER. ROTATE THE TEMPLATE UNTIL LOWER EDGE INTERSECTS AT THE POINTS MARKED. THEN TRACE LOWER EDGE.
PLOT CENTER & TIP RIBS ALONG THE CAMBER LINE. CONNECT SIMILIAR POINTS WITH STRAIGHT LINES. DIVIDE THE LINES INTO A NO. OF EQUAL SPACES CORRESPONDING TO THE NO. OF RIBS REQ'D. CONNECT THE POINTS WITH A FRENCH CURVE.
SWING TWO ARCS FROM C.P. LINE TO L.E. AND T.E. DIVIDE EA. INTO A CONVENIENT NO. OF EQUAL SPACES. DIVIDE EA. WING PANEL INTO A LIKE NO. OF EQUAL SPACES. PROJECT OUT TOWARD TIP UNTIL LINES LINES INTERSECT. CONNECT POINTS WITH CURVED RULER.
TIP STYLES
SOLID BALSA
SHEET BALSA 45° APPX.
NOTE GRAIN
THIN, LAMINATED STRIPS
SHEET

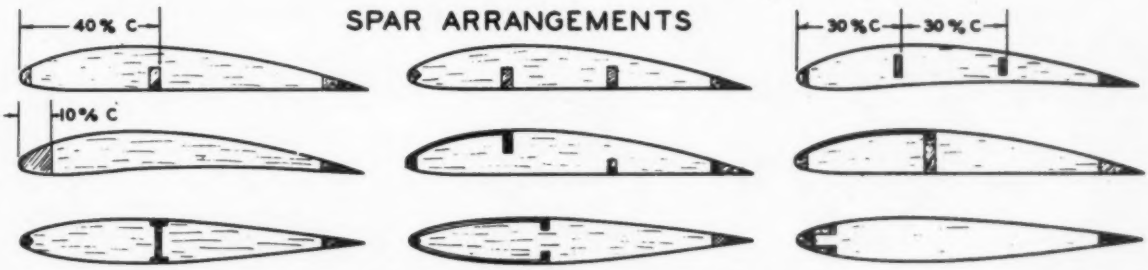
TYPICAL WING ARRANGEMENT



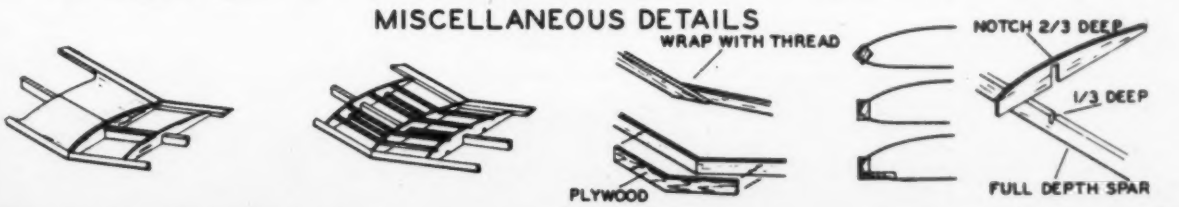
POPULAR WING TYPES


SINGLE SPAR TYPE
SINGLE SPAR WITH FALSE RIBS
SPARLESS WITH HEAVY LEADING EDGE
NOTCH
NOTCH
MULTI-SPAR
DOUBLE SPAR WITH SHEETED LEADING EDGE
SAME AS AT LEFT BUT WITH CAPPED RIBS
SHEET BALSA TOP UNCOVERED BOTTOM
HARD BALSA L.E. HARDWOOD SPAR SOFT BALSA T.E.
SEMI-GEODETIC

SPAR ARRANGEMENTS



MISCELLANEOUS DETAILS

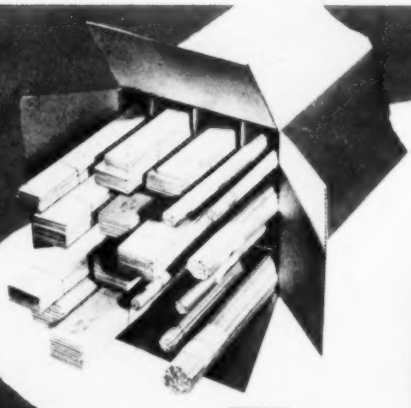


FOR YO

TESTORS SCALE

SPITFIRE MK-19
Wing span ..... 17½"
Overall length ..... 16"
Retail price $1.50

F-86 SABRE JET
Wing span ..... 17"
Overall length ..... 19"
Retail price $2.00



TESTORS
BRANDED BALSA

INSIST ON THESE TESTORS MODEL SUPPLIES . . . BY NAME

TESTORS DOPE

"39" MODEL
ENGINE FUEL

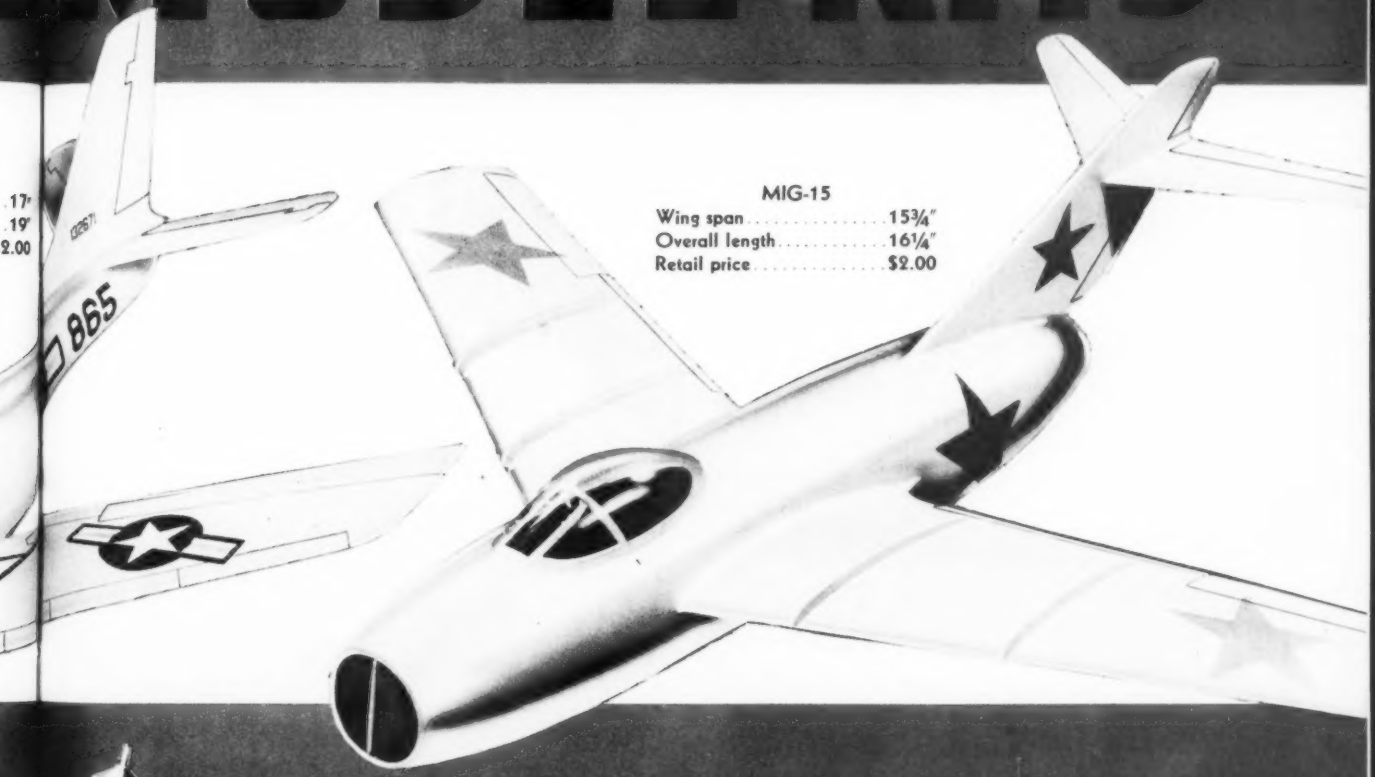
STA HOT FUEL PROOF
FINISH

TESTOR CHEMICAL COMPANY • ROCKFO

DISPLAY COLLECTION...

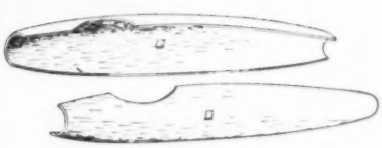
Authentic

MODEL KITS

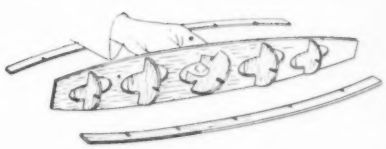


MIG-15

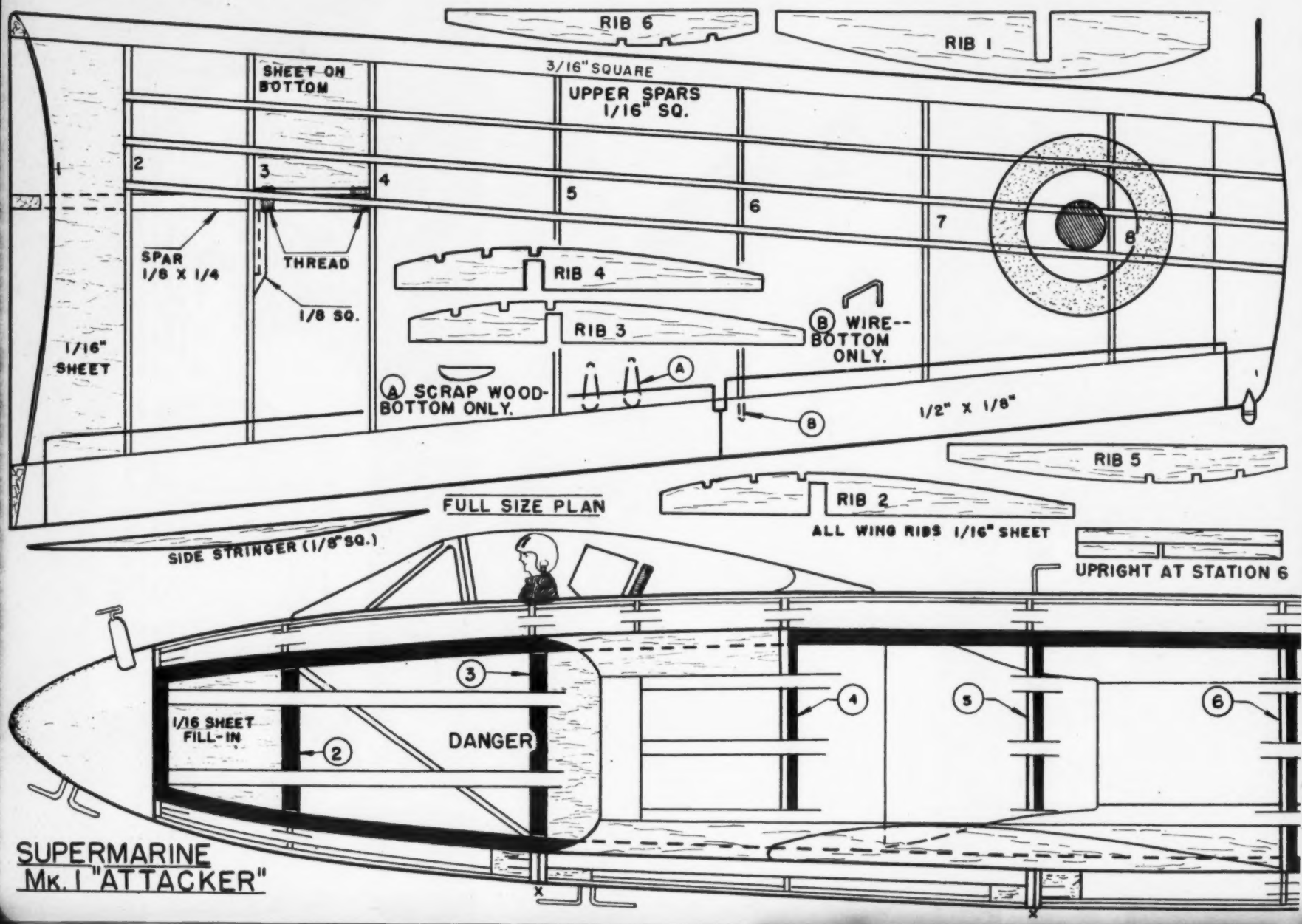
Wing span	15¾"
Overall length	16¼"
Retail price	$2.00



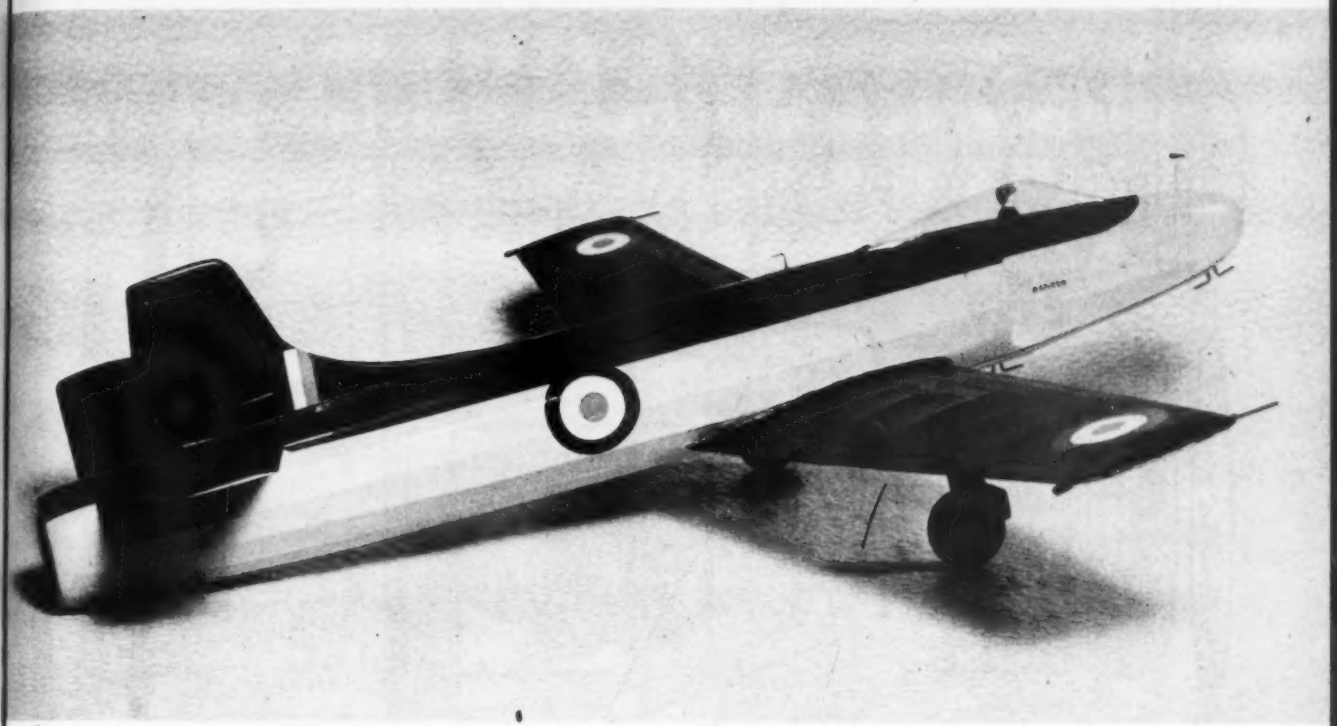
MOLDED BALSA PARTS . . . fuselage half-sections and wing half-sections are actually molded into shape! This production process is an important Testor development that simplifies and speeds construction . . . adds realism to appearance . . . makes possible a more perfect finish on the model.



KEY-LOK ASSEMBLY . . . note how formers fit securely into place in the keel section with the simple slot-slide action of a key turning in a lock. This exclusive construction technique (patents pending) insures positive position and correct alignment of parts . . . gives the model greater strength . . . saves building time and work.



SUPERMARINE Mk. I "ATTACKER"

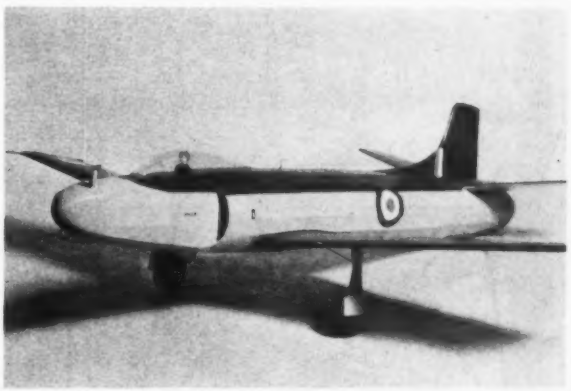


Long, rather wide streamlined fuselage of the *Attacker* provides ideal internal space for installing the long augmentor tube. Note intake position.

The Supermarine Attacker

by ROBERT BURAGAS

The Jetex 150 with augmentor tube opens a new field of jet scale free flight. These are full size plans.



Rounded off box fuselage, straight tapered wings are easily built.

Many of us are finding out that the "mother lode" of flying fields is petering out, making it necessary to season our diet of contest models with the spice of more colorful, sporty model types for use on smaller fields. One of the leading possibilities for a new and interesting type of modelling is the flying scale jet model. Today's Jetex 150 with augmentor tube is an ideal powerplant and, added to the British Navy's Supermarine *Attacker* jet fighter, will give you much enjoyment both building and flying.

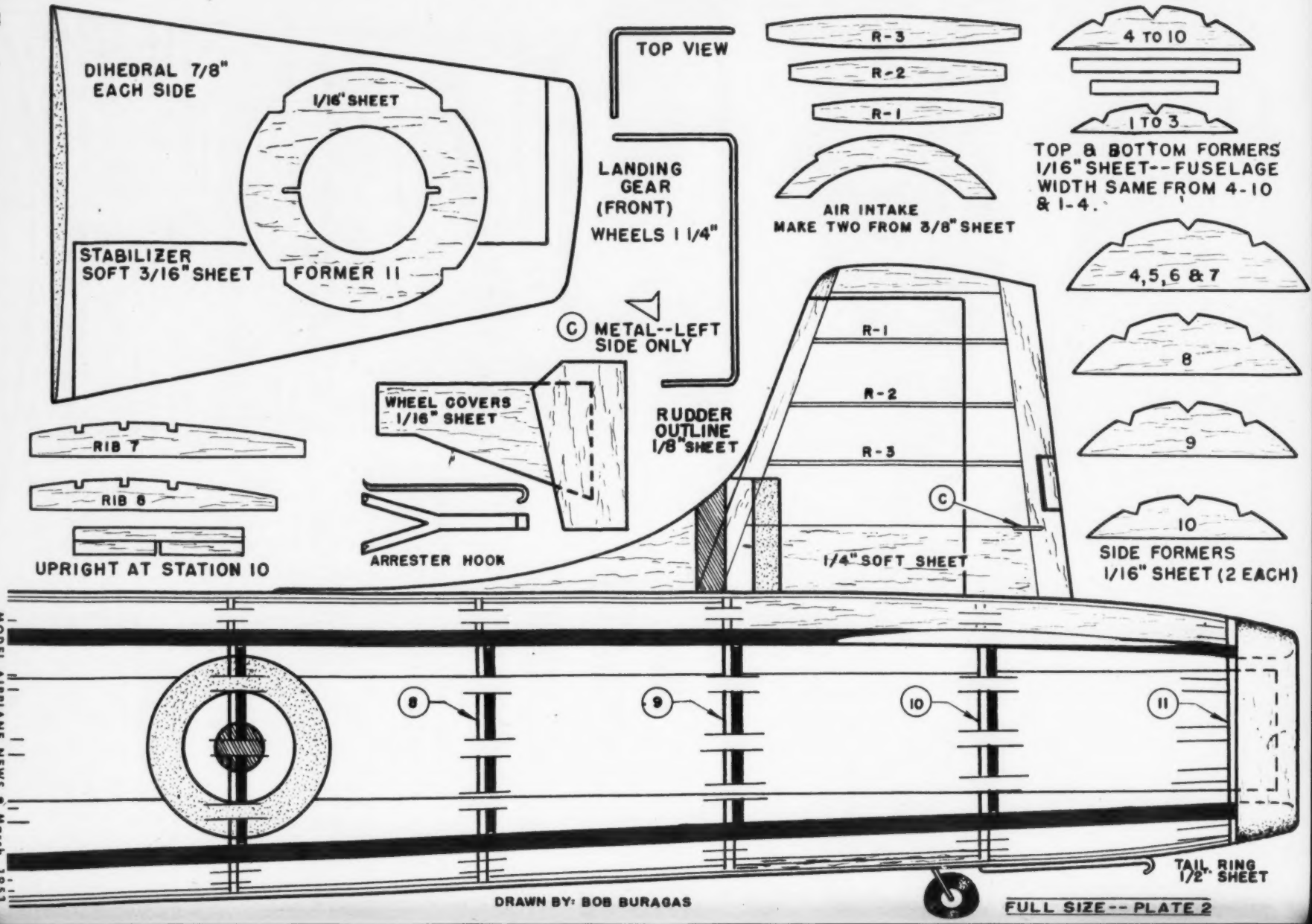
Before starting, it is necessary to cement the plan halves together. Study these plans carefully so that you understand the location of the principal parts. Mark out the various parts on balsa following the outlines shown on the plan.

Start your model by building the fuselage. The construction is simple though it looks elaborate on paper. Follow the heavy black lines to build the basic fuselage sides using 1/8" square balsa for material. Note that there is no upright at the very rear of the fuselage. Having constructed two of these sides, fill in the front sections with 1/8" sheet. When this is dry, you will be ready to assemble the two sides into a box. Since the fuselage is built around the augmentor tube you will need to double the inner surfaces of the uprights at stations six and ten. Use 1/8" square for this and note the slot which is left for the augmentor tube flange.

Place the augmentor tube between the fuselage sides so that the augmentor tube flanges rest in the slots at stations six and ten. Drawings for the crossbraces are shown on the plan between the drawings for the top and bottom formers. Use the large crossbrace for all of the stations from four back to ten. The smaller crossbrace is used at station one and the others are cut to fit. When the basic box is finished, the augmentor tube will be sticking out of the sides. Since the side formers are wider than the overhang of the bell-shaped funnel, there will be plenty of clearance in the finished structure.

A small section between station three and the rear of the air intake block should be filled in with 1/16" sheet. Two air intakes blocks should be cut out of 3/8" sheet and cemented in place at this point. Add the side formers but not the stringers.

Cement the top and bottom formers in their proper locations. The upper former between *(Continued on page 54)*



DRAWN BY: BOB BURAGAS

FULL SIZE-- PLATE 2

If it's CLEVELAND it's Good!

For Over 1/3 Century Now!

Build these SIMPLEX Jet Jobs!

(Left) 14¼" MC DONNELL F-88 VOODOO S-127 — 18" NORTHROP F-89 SCORPION S-128 (Top Left) — (Above) 14¼" REPUBLIC F-84 F THUNDERJET S-126 — $1 Each

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All parts in this line are die-cut, ready for quick easy assembly. Simplex models are tissue covered

18" RUSSIAN MIG-15 S-124
18" McDONNELL BANSHEE S-122
18" LOCKHEED F-90 S-121
18" VOUGHT CUTLASS S-123
20" VOUGHT CORSAIR S-79
27" PIPER CUB S-94

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The Line For Serious Model Builders. Parts Printed Out. A Pleasure To Assemble — $1.50 EACH

30" F-9F GRUMMAN PANTHER IT-111
30" P-40 WARHAWK IT-77
30" F-80 SHOOTING STAR IT-90
24" F-51 MUSTANG IT-91
24" F-86 SABRE IT-120
30" P-39 AIRACOBRA IT-76

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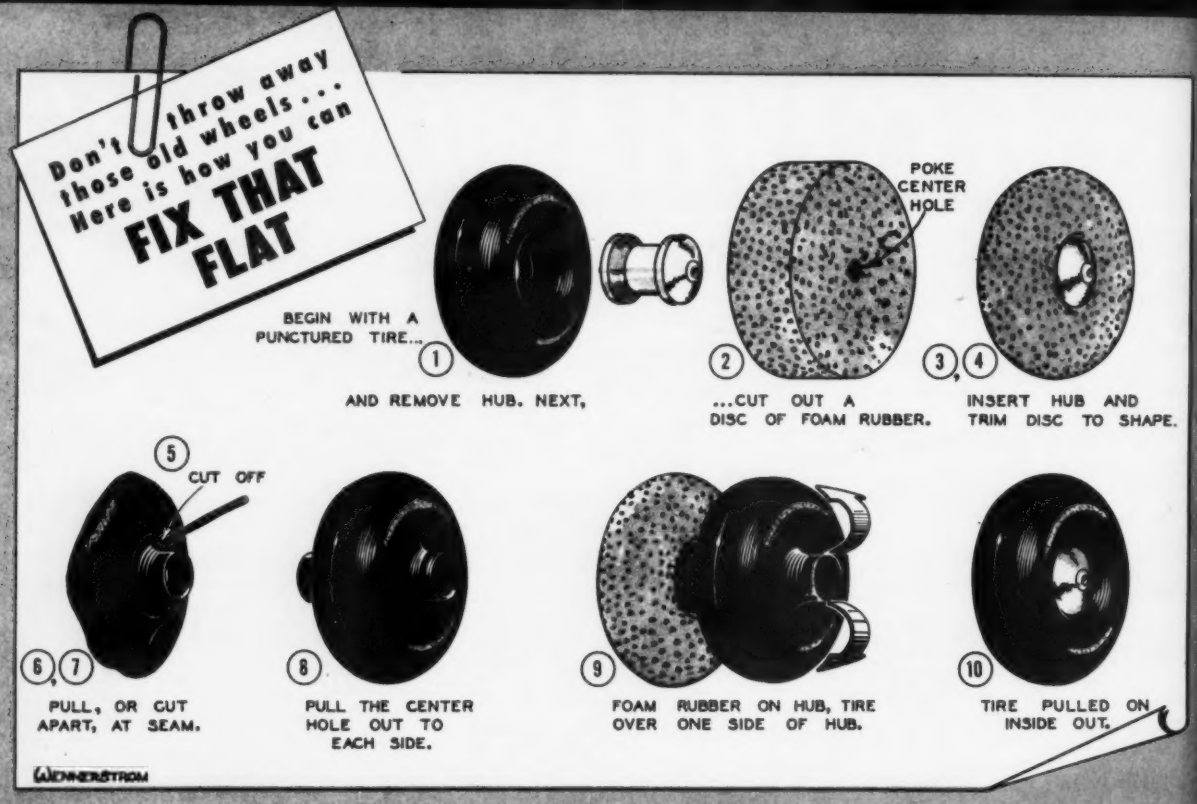

Don't throw away those old wheels . . . Here is how you can
FIX THAT FLAT
BEGIN WITH A PUNCTURED TIRE...
1
AND REMOVE HUB. NEXT,
POKE CENTER HOLE
2
...CUT OUT A DISC OF FOAM RUBBER.
3, 4
INSERT HUB AND TRIM DISC TO SHAPE.
5
CUT OFF
6, 7
PULL, OR CUT APART, AT SEAM.
8
PULL THE CENTER HOLE OUT TO EACH SIDE.
9
FOAM RUBBER ON HUB, TIRE OVER ONE SIDE OF HUB.
10
TIRE PULLED ON INSIDE OUT.
WINNERSTROM

Lightweight airwheels are swell — until they get punctured. So what do you do then? Fill 'em with foam rubber, of course. It's cheap, easy; reworked wheels will wear forever.

by KEN WILLARD

The popularity of the half-A free flight models, sport and scale jobs, has increased the need for lightweight, shock-absorbing wheels. One of the best types available is the doughnut shaped, air inflated rubber wheel with a wooden hub. These wheels give excellent shock absorbing characteristics, and are very realistic in appearance.

But if a leak develops, there goes your tire, and with it the usefulness of the wheel. This can be become a pretty expensive process.

But wait a minute. Don't throw that old wheel out yet. You can more than double the life of the tire by a little work. Figure it out—in ten minutes you can make it even better than new, and if the average price for the small wheels is fifty cents a pair, you're saving dough at the rate of $3.00 an hour—and that's pretty good pay these days.

Here's how you do it. Stop in at the dime store, drug store, or variety store and pick up some foam rubber sponges. There are various kinds available. They cost from ten cents to fifty cents, depending on how big they are. A ten cent facial sponge will fill two sets of the small wheel tires if you use care in cutting up the sponge.

Pick up the size of foam rubber sponge that has the right thickness to fill out your tires. I have found that a 1/2" thick piece is about right for the wheels up to 1-1/2" in diameter. If you desire to fill larger wheels, find a piece whose thickness is equal to or slightly larger than the width (not the diameter) of your tire when it is inflated.

Now you're ready to fix that flat. Just follow these easy steps:

1—Pull tire of wooden hub;

2 — Cut out a piece of foam rubber, large enough to be trimmed down to a size just slightly larger than the tire itself. About 1-1/16" oversize all around works out pretty well;

3—Before you start trimming the foam rubber to size, poke a hole as near the center as possible, and slide wooden hub in place. Keep hole smaller than hub, and stretch the foam rubber over the hub. This will insure a tight fit. Be careful when stretching the foam rubber so that you don't tear it too much;

4—Now trim foam rubber to size—just slightly larger than the tire, as I mentioned before. By doing the trimming while the foam rubber is on the hub you can make a true running wheel;

5—You are now ready to start the "retread." Cut off inflating tube at tire wall;

6—Pull center of tire out to one side. You will find that the sealing seam appears here, with centers of the two sides of the tire sealed in an overlapping seam;

7—Pull seam apart or, if it is sealed too tightly to pull apart, push center of tire well out to one side and cut around the seam, as if you were trimming off the bottom end of a funnel. This will cut seam apart evenly;

8—Now pull centers of each side out so that they stick out on either side;

9—Wrap one center hole over one side of the hub on which you have the foam rubber filling. You now have foam rubber on the hub, and tire attached over the hub on one side only;

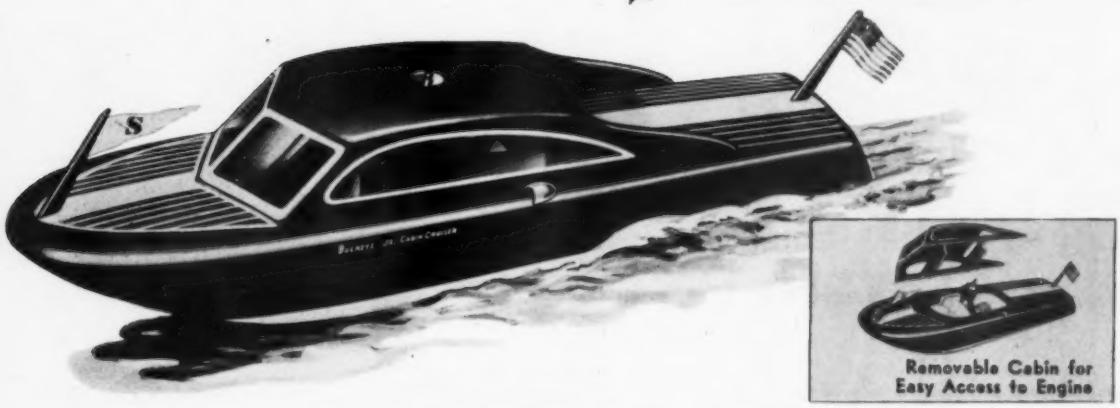
10—The final step is just a bit tricky, but with a little care you should be able to do it the first time. Stretch the free center hole of the tire as wide open as you can (careful!) and, by turning tire inside out, stuff foam rubber filling, hub and all, right inside the tire. By compressing the foam rubber you can reduce the amount of stretching which is required of the center hole of the tire, and thus keep within the elastic limit of the rubber.

All that remains now is to tuck in the center hole (which was stretched to insert the foam rubber) around the hub, and you have a wheel which will keep "inflated" with foam rubber until the tire rots away from the hub! If you were careful in trimming the foam rubber, *(Continued on page 38)*

Scientific announces the great ***new***

Buckeye Jr.

Cabin Cruiser



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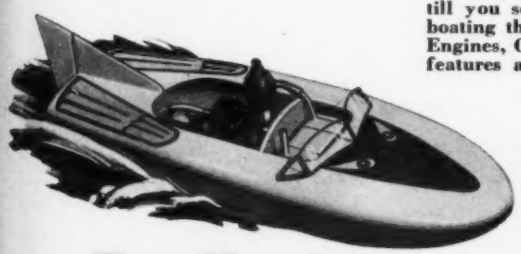

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ENGINE REVIEW

WEN-MAC .049

Designed by Bill Atwood, Wen-Mac's new .049 is an all-out effort to insure the beginners success. Has a number of worthwhile features.

Features include an extra tank for stunt; open holes for mounting bolts for thrust line adjustment, a flexible needle valve.

by TED MARTIN

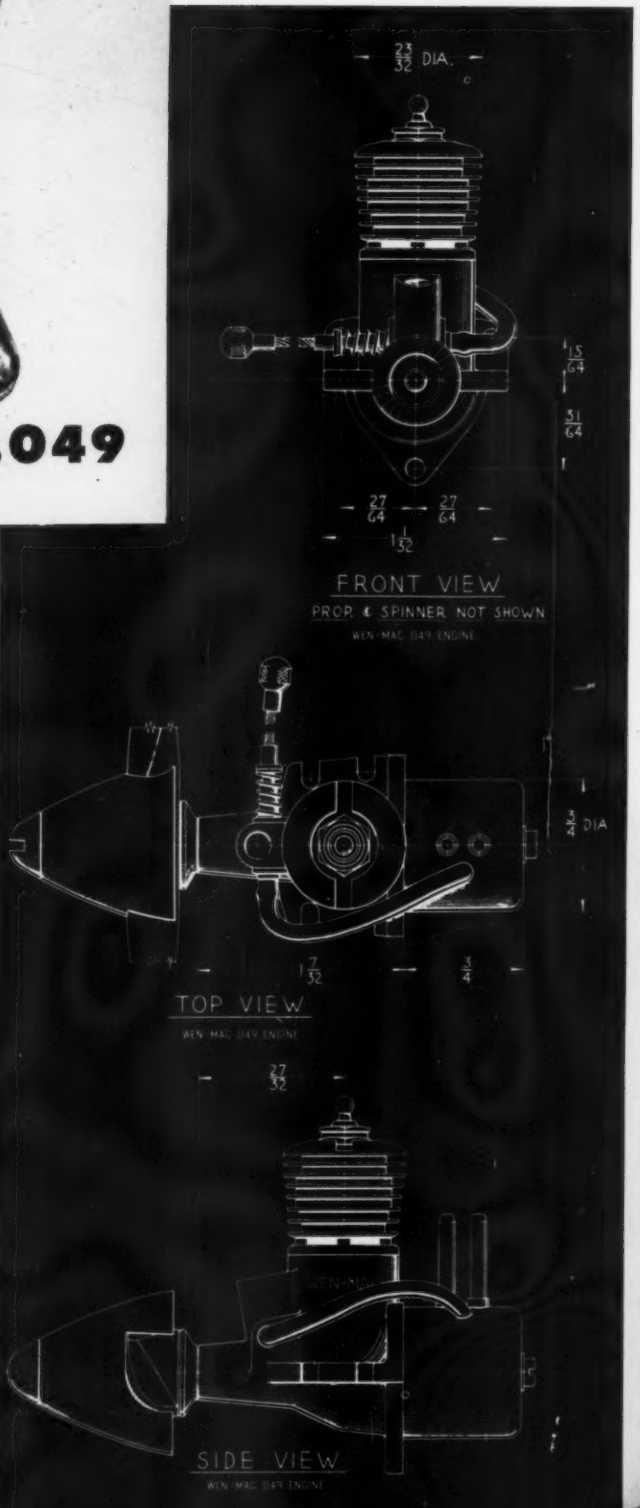
A new engine designed by Bill Atwood is always news. Designed for, and manufactured by, the Wen-mac Corporation, the Wen-mac .049 incorporates the basic principles of the well known Atwood *Wasp* with several new features which add to the convenience and versatility of installation.

The new Wen-mac comes with an impressive number of useful accessories, including mounting bolts, plug clip, combination wrench, plastic spinner, plastic prop and a very comprehensive three color instruction manual which explains in simple language exactly how the engine works and how to interpret its behavior and diagnose any troubles. In addition to the standard fuel tank fitted to the engine, a large capacity stunt tank with fuel line is also furnished which is easily interchanged by substituting the tank retaining bolt with a longer one supplied.

The appearance of the engine itself is also calculated to catch the eye with its bright red fuel tank and cylinder head, and with the red spinner and white prop fitted, the result is colorful to say the least.

It is a well known fact that a brand new engine is much more difficult to start on its first run than on subsequent occasions, and with this in mind, every Wen-mac is block tested before leaving the factory. The example we tested started extremely easily and there was a conspicuous absence of the slight stiffness usual with a new engine. This ease of starting in conjunction with the very thorough handling instructions, and the provision of every accessory needed for installation and running except fuel, battery and wire, makes the Wen-mac a good proposition for the beginner.

The more experienced modeller may find the language and explanations *(Continued on page 44)*



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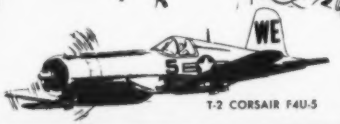
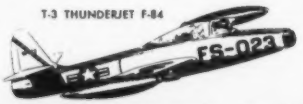


T-2 CORSAIR F4U-5

T-1 MUSTANG F-51



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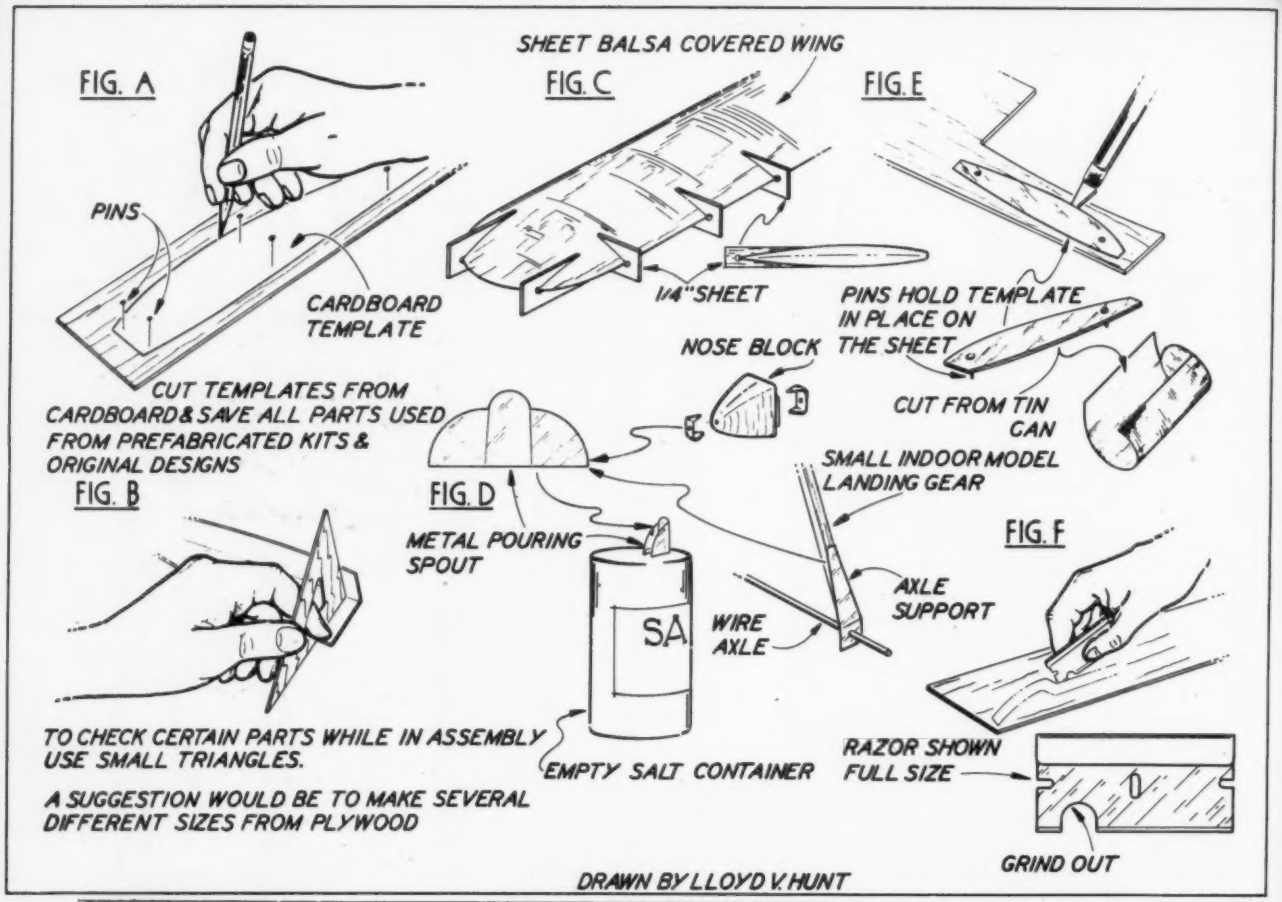

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Fix That Flat

(Continued from page 34)

keeping it slightly larger than the tire, when the tire is stretched over the foam rubber the latter will fill up the tire just like it was air inflated. The tire will compress the foam rubber slightly and give the desired degree of firmness and resiliency.

If by chance you didn't get the foam rubber tucked in straight in the first place, you will find that you can work it around inside the tire to obtain the true running shape you *want*. Now the wheel should last forever — well, practically!

If the rubber starts to rot away, paint it with some of this liquid rubber cement that is used for weatherstripping. Costs about a penny for one set of wheels. I *hate* to spend money — don't you?

Secrets

(Continued from page 13)

Along with stab area and moment arm to resist the upward tendency of the nose, the thickness of the stab airfoil and the angular difference between wing and tail must be considered. For convenience, let's think of a theoretical zero degree line through the fuselage as the line from which all our angles will be measured. Let's say that the stab is set parallel to this zero datum line, or at zero degrees angle of attack, and let's pick a figure at random, say set the wing at two degrees positive angle to this datum line. This setup will give us a two degree angular difference between the wing and tail. With this figure held constant, we can resist this nose-up moment by thickening the stab airfoil, by increasing the size of the stab, or by lengthening the moment arm.

However, we are not trying to eliminate nose-up; we are just balancing it to a point of best rate of climb for the model. What causes

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this nose-up tendency? Under power, the lift and drag of the wing, plus the fact that for most models the center of drag of the entire model is above the thrust line, causes the force of thrust to attempt to revolve around the center of drag of the model. Keep in mind that lift and drag increase as the square of the speed (double speed will equal four times as much lift and drag), so the faster the model, the more nose up tendency.

The ratio of wing airfoil to stab airfoil thickness that I have adopted is 70 percent. With a wing airfoil, say, of ten percent thickness, I use a stab of seven percent thickness. If the wing and stab had the same chord, the stab would be 70 percent as thick as the wing; however, this is not the case in my ships. My stabs are the modified rectangular type with the chord 85 percent that of the center panels of the wing. To be more specific the mean, or average, chord of my class B ships is 9-1/4 in. with a stab chord of 8-1/2 in., which gives me an actual wing-stab chord ratio of 89.5 percent. To give an example of these ratios, a wing with a 10 in. chord would be one inch thick and the stab chord would be 85 percent of 10 in. or 8-1/2 in. with a thickness of 70 percent of 8-1/2 or approximately .6 inches.

(To be continued)

The Sidewinder

(Continued from page 16)

crank are used; these can be purchased at any hobby shop. Holes will have to be drilled in the wing guide to allow lines to pass through.

Rudder and stabilizer are cut out and sanded smooth. Elevator is cut from the stabilizer and hinges are cemented in place. Make sure these work freely. The horn is fastened with bolt, washer and nut on the bottom. Cement these in place.

The entire model is coated with clear dope and, when dry, sanded. This is repeated several times until the balsa surface is filled and edges are smooth. Model can be color doped and any trim added as builders desire. The model will have to be fuel proofed if the dope used was not of the fuelproof type.

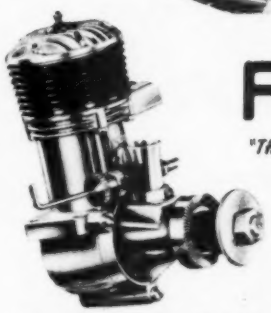
Mount tank, using a piece of tubing to hold it in place. This is on the lower overflow pipe which extends through the wing. Mount engine with the bolts. Use two nuts on each bolt. Connect tank to needle valve body. It may be wise to fasten the engine in a bench mount and run it a few times to get accustomed to starting procedure.

If the model is to be flown with the single line, elevator has to be locked. This is done by bending up the wire that slips over the elevator. Fasten a line to the lower rear engine bolt and run it out through the wing guide, making a loop at the outer end. Fasten a line (about 20 feet long) to this loop and the other end to a handle. A six inch piece of 1/2" dowel is a passable handle.

Start engine but do not allow plane to take-off with engine peaked out, or screaming at maximum rpm. When engine has been peaked out on the ground, open needle valve slightly until a trace of smoke appears in the exhaust and the rpm's drop off slightly. This is running the engine slightly "rich." When ship becomes airborne, it will lean out the engine due to forward speed through the air. If you start the flight with a lean engine it will cut out in the air.

Have helper release model. At the same time, step back to keep line tight. Turn with model as it flies and, when you can do this to your satisfaction, unlock stabilizer and hook up bell-crank. Start off in the same manner and keep wrist stiff at all times; only raise the arm a little at a time so as not to overcontrol the model which is the easiest way to CRACKUP.

END



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AMA RECORDS

With the '53 contest season coming up, these are the marks to shoot for.

Indoor Hand-Launched Stick

21:08.2	Ronald Cummings	
B, Jr.	Los Angeles, Calif.	7/28/52
25:37.6	Don Kennedy	
B, Sr.	Burbank, Calif.	4/18/48
26:53.6	Wilbur F. Tyler	
B, Op.	Piermont, N. Y.	9/12/48
22:51.8	Frank Cummings III	
C, Jr.	Los Angeles, Calif.	7/28/48
24:52.6	Anthony D'Alessandro	
C, Sr.	Philadelphia, Penna.	8/14/49
32:19.8	Pete Andrews	
C, Op.	Forest Hills, N. Y.	8/14/49
15:06.4	Paul Simon	
D, Jr.	Detroit, Mich.	7/26/49
22:54.6	Thomas Greet	
D, Sr.	Philadelphia, Pa.	6/29/47
30:37.2	Wilbur F. Tyler	
D, Op.	Piermont, N. Y.	9/25/49

Indoor R.O.G. Cabin

12:42.3	H. Kaczynski	
B, Jr.	Detroit, Mich.	7/5/40
15:09.3	David Call	
B, Sr.	Philadelphia, Pa.	4/20/41
18:44.6	Don Kennedy	
B, Op.	Burbank, Calif.	7/9/49
11:32.3	R. Jagiello	
C, Jr.	Chicago, Ill.	7/5/40
16:52.5	Erwin Rodensky	
C, Sr.	Detroit, Mich.	3/17/50
24:35.2	David Lane Call	
C, Op.	Philadelphia, Pa.	9/25/49

Indoor R.O.W. Cabin

0:37.6	Hermann Andresen	
B, Jr.	Chicago, Ill.	11/5/49
13:13.0	David Call	
B, Sr.	Philadelphia, Pa.	6/13/42
11:17.0	David Call	
B, Op.	Philadelphia, Pa.	9/28/47

Indoor Autogiro

3:53.7	Edward A. Vargo	
Jr.	Chicago, Ill.	4/11/42
2:51.2	Ralph Brown	
Sr.	Arlington, Mass.	4/20/40
2:45.5	Joseph P. Matulis	
Op.	Chicago, Ill.	11/16/41

Indoor Ornithopter

1:18.0	Edward A. Vargo	
Jr.	Chicago, Ill.	12/27/41
3:22.0	John Bock	
Sr.	Chicago, Ill.	1/3/42
4:05.4	Carl Goldberg	
Op.	Chicago, Ill.	8/16/41

Indoor Helicopter

3:54.6	Richard Quermann	
Jr.	Clarksburg, W. Va.	1/12/41
5:34.4	James Broderick	
Sr.	Chicago, Ill.	12/27/41

Indoor, Hand-Launched Glider

5:25.0	Carl Goldberg	
Op.	Chicago, Ill.	11/16/41
0:49.2	Bruce Strehlow	
A, Jr.	Lynwood, Calif.	3/13/49
1:01.0	Einar Enevoldson	
A, Sr.	San Francisco, Calif.	3/20/49
1:06.0	Jack S. Strehlow	
A, Op.	Cypress, Calif.	3/13/49
0:56.4	Jerry Robertson	
B, Jr.	Phoenix, Ariz.	7/28/52
1:04.2	Don Alberts	
B, Sr.	Albuquerque, N. Mex.	7/28/52
1:14.0	Joe Foster	
B, Op.	San Jose, Calif.	7/28/52

Outdoor Rubber and Glider, Unlimited

11:19.2	James C. Watson	
Jr.	Ft. Des Moines, Iowa	8/24/51
18:00.0	Otto Heitchecker	
Sr.	Detroit, Mich.	6/30/51
18:00.0	Manuel D. Andrade	
Op.	Oakland, Calif.	4/22/51
18:00.0	James Onofri	
Op.	Morrisville, Pa.	9/9/51
Jr.	NO RECORD ESTABLISHED	
Sr.	NO RECORD ESTABLISHED	
7:08.0	Edward O. Slobod	
Op.	Hollywood, Calif.	8/5/51
7:17.6	Don Tune	
Jr.	Los Angeles, Calif.	7/27/51
12:04.2	Don Tune	
Sr.	Los Angeles, Calif.	8/1/52

Outdoor Rubber and Glider, Wakefield

15:00.0	Joe Bilgri	
Op.	San Jose, Calif.	4/22/51
15:00.0	Thomas R. Quermann	
Op.	Bayside, N. Y.	8/1/51
Jr.	NO RECORD ESTABLISHED	
0:20.2	Wm. F. Foshag	
Sr.	Washington, D.C.	7/25/48
0:50.4	Parnell Schoenky	
Op.	Kirkwood, Mo.	5/13/51
Jr.	NO RECORD ESTABLISHED	
1:25.4	Wm. R. Bigge	
Sr.	Washington, D. C.	7/25/48
0:48.4	Parnell Schoenky	
Op.	Kirkwood, Mo.	7/18/48

Outdoor, Helicopter

2:11.4	Thane Bopp	
Jr.	Kirkwood, Mo.	8/19/51
5:22.6	Harvey S. Robbers, Jr.	
Sr.	Oakland, Calif.	6/6/48
8:55.0	Frank Ehling	
Op.	Jersey City, N. J.	7/3/48

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Actual photograph of model built from Kit.

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Deluxe 66-Pc Scale Marine Fittings, Kit B-7F. **$4.95**

$11.95 (less scale marine fittings)

Outdoor, Hand-Launched Glider

11:14.0	Jimmy Jackman	
A, Jr.	Oklahoma City, Okla.	7/30/52
22:21.4	Gene Jackmann	
A, Sr.	Oklahoma City, Okla.	6/29/52
15:26.2	Ray Matthews	
A, Op.	Oklahoma City, Okla.	7/25/51
1:03.2	John Thornhill	
B, Jr.	Washington, D. C.	4/20/52
B, Sr.	NO RECORD ESTABLISHED	
15:16.8	Dick Everett	
B, Op.	San Diego, Calif.	7/25/51

Outdoor, Towline Glider

2:57.0	Bill Bay, Jr.	
C, Jr.	Daytona Beach, Fla.	12/29/51
7:51.0	James Baltes	
C, Sr.	North St. Paul, Minn.	6/15/52
10:18.0	Thomas H. Henebry	
C, Op.	Chula Vista, Calif.	7/29/52
12:03.2	James Watson	
D, Jr.	Ft. Des Moines, Iowa	7/24/51
30:00.0	Murray Feigenbaum	
D, Sr.	Brooklyn, N. Y.	6/17/51
21:09.0	John Dooley	
D, Op.	Crossville, Tenn.	6/23/51

Free Flight Gas, R.O.G. Type

29:49.8	David Hewitt	
½A, Jr.	Portland, Ore.	6/22/52
30:00.0	Douglas Campbell	
½A, Sr.	South Bend, Ind.	8/17/52
30:00.0	William K. Johnke	
½A, Op.	Uniondale, N. Y.	7/13/52
28:36.2	Johnnie S. Werts	
A, Jr.	Oildale, Calif.	4/8/51
30:00.0	Homer Werts	
A, Sr.	Oildale, Calif.	4/1/51
30:00.0	Kenneth R. Fitch	
A, Op.	Garden City, N. Y.	9/16/51
23:50.0	Bernard Boehm	
B, Jr.	South Bend, Ind.	6/25/50
28:02.0	Homer Werts	
B, Sr.	Oildale, Calif.	9/2/51
30:00.0	Don C. Sutton	
B, Op.	Phoenix, Ariz.	3/4/51
30:00.0	Elmer J. Roth	
B, Op.	Salem, Ore.	7/13/52
22:49.0	Jack Hudspeth	
C, Jr.	Olympia, Wash.	8/16/50
30:00.0	Gary B. Christiansen	
C, Sr.	Salt Lake City, Utah	4/20/52
30:00.0	Lyle O. Corby	
C, Op.	San Diego, Calif.	4/16/50
30:00.0	Robert L. Ottoman	
C, Op.	Medford, Ore.	6/10/51
30:00.0	Kenneth E. Ernst	
C, Op.	Indianapolis, Ind.	8/19/51

Free Flight Gas, R.O.W.

18:48.4	Bruce Tune	
½A, Jr.	Los Angeles, Calif.	7/31/52
16:37.0	Bob Gelvin	
½A, Sr.	Topeka, Kans.	7/31/52
17:02.0	James P. Taylor	
½A, Op.	Albuquerque, N. Mex.	10/12/52
7:43.6	Don Tune	
A, Jr.	Los Angeles, Calif.	8/5/51
15:19.0	Edward R. Mate	
A, Sr.	Chicago, Ill.	7/31/52
18:44.4	Daniel C. Lutz	
A, Op.	Los Angeles, Calif.	7/26/51
4:11.8	Bill Lofland, Jr.	
B, Jr.	Abilene, Tex.	7/26/51
10:56.6	James M. Coffin	
B, Sr.	Long Beach, Calif.	7/31/52
19:38.6	Elmer Scaggs	
B, Op.	Wichita Falls, Tex.	7/31/52

Free Flight Gas, PAA Load

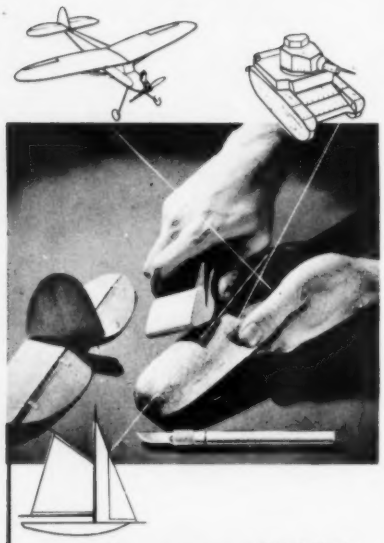
C, Jr.	NO RECORD ESTABLISHED	
8:25.4	Eugene Wallock	
C, Sr.	San Gabriel, Calif.	10/28/51
18:15.6	Don W. Steele	
C, Op.	Lubbock, Tex.	10/22/50
5:14.4	Greg Weissenberger	
½A, Jr.	Los Angeles, Calif.	8/2/52
12:27.2	Roger L. Barron	
½A, Sr.	Springfield, Va.	8/3/52
26:09.0	Richard R. Sladek	
½A, Op.	San Diego, Calif.	8/2/52
6:01.2	Hal Cover	
AB, Jr.	Glendale, Calif.	8/3/52
16:54.2	Clinton Merrill	
AB, Sr.	Oildale, Calif.	8/3/52

Free Flight Gas, PAA Cargo

23:53.4	Fran Uyematsu	
AB, Op.	Montebello, Calif.	8/3/52
Jr.	NO RECORD ESTABLISHED	
14.5 ozs.	James P. Kohls	
Sr.	Detroit, Mich.	8/3/52
17.25 ozs.	Robert E. Latham	
Op.	Dallas, Tex.	8/3/52

Control Line Speed

116.38	Sonny Wheeler	
A, Jr.	Roanoke, Va.	9/16/51
123.41	Eugene Stiles	
A, Sr.	Sheppard AFB, Tex.	5/25/52
135.08	George Mueller	
A, Op.	Phoenix, Ariz.	7/14/52
136.31	Roger Welden	
B, Jr.	Rockford, Ill.	6/22/52
135.08	Richard Rigney	
B, Sr.	Long Beach, Calif.	1/22/50
136.93	Anthony Grish	
B, Op.	St. John, Ind.	7/25/51
128.61	Richard A. Modler	
C, Jr.	Dayton, Ohio	8/18/50
137.46	Jack Friedland	
C, Sr.	Oakland, Calif.	7/27/51
137.14	Jack Friedland	
C, Op.	Oakland, Calif.	8/3/52
154.44	William C. Weissbrodt	
D, Jr.	Milwaukee, Wisc.	9/22/51
157.55	Franklin Francisco	
D, Sr.	Rochester, N. Y.	6/1/52
162.53	Harold F. deBolt	
D, Op.	Williamsville, N. Y.	9/17/50
138.62	Kenneth Mattingly	
Jet, Jr.	Hialeah, Fla.	8/23/51
157.69	Herbert L. Davis	
Jet, Sr.	Birmingham, Ala.	6/10/51
154.95	Thomas P. Baker	
Jet, Op.	Kings Mtn., N. C.	7/8/51



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official news

by RUSS NICHOLS and CARL WHEELEY

New Rules • Six-minute limit • Combined C, D, Speed • Nordic glider official • A new deal in rubber • Class Half A in Speed • And no stunt in scale control line.

NEW RULES. Thanks to the speedy work of the AMA Contest Board and especially its chairman, Ray Matthews, in tabulating 1480 ballots, we are able to announce at this early date what most of the rules will be for the next two years.

The changes to the rules which follow started out in late 1951 as ideas on a trial rule questionnaire which was distributed to AMA Leader members and chartered clubs and chapters. The ideas came from you, the modelers in the field, who sent them originally to the advisory committees, the Contest Board, or to AMA Headquarters. From the results of the trial questionnaire, Contest Board Chairman Ray Matthews was able to tell which of the proposals were suitable for a nation-wide rule ballot. Before the final rule-change ballot was compiled, the Contest Board and advisory committees were again polled to see if more proposals had been received. It was these last proposals, the ones from the trial questionnaire, and the ones that met with favor of the rules meetings held at the Nationals that were included on the final rule-change ballot which was mailed to all AMA members last October.

These are the changes that will be in effect for 1953 and 1954.

GENERAL: A six-minute flight limit has been adopted for all outdoor free flight classes (excepting Wakefield and Nordic Glider—more about the Nordic Glider class later).

For all outdoor free flight classes with maximum time limits, a fourth flight with no time limit will be allowed when three maximum flights have been completed.

For classes of models that require AMA license numbers, these numbers must now be at least one inch in height.

FREE FLIGHT GAS: No change (except for maximum time limit).

CONTROL LINE SPEED: Classes C and D are now combined.

A Half Class has been added with maximum piston displacement set at .050 cu. in. AA models are to be flown for 1/4 mile (six laps) on .006" wires of 35' length.

OUTDOOR RUBBER: Unlimited rubber has been changed to a limited class for models having a maximum combined wing and stabilizer area of 200 sq. ins. and weighing at least five ounces.

TOWLINE GLIDER: Former classes of towline glider have been eliminated. In their place will be two classes; the international Nordic A/2 glider class and a limited class for models having a maximum combined wing and stabilizer area of 350 sq. ins., and weighing at least ten ounces.

Main requirements for Nordic gliders are that the projected area of the wing and stabilizer (combined) be between 496 and 527 sq. ins., they must weigh at least 14.46 ozs., and the minimum allowable fuselage cross-section is figured by dividing 100 into the total combined wing and stabilizer area.

A 328' towline is now permitted for both classes.

INDOOR RUBBER: No change.

OUTDOOR HAND-LAUNCHED GLIDER: Previous classes are combined.

INDOOR HAND-LAUNCHED GLIDER: Previous classes are combined.

RADIO CONTROL: The AMA Radio Control Committee is working up 1953 RC rules which will be announced later.

TEAM RACING: No change.

CONTROL LINE PRECISION ACROBATICS: The 1951-52 Precision Acrobatic pattern will be expanded to include more maneuvers. In addition, there will be a greater point break-down in scoring maneuvers and the rules will be more rigid, requiring specific entries into maneuvers, etc.

CONTROL LINE FLYING SCALE: Models entered in this event will not be required to fly the control line precision acrobatic maneuvers.

FREE FLIGHT FLYING SCALE: AA free flight flying scale will replace rubber-powered flying scale. A committee has been appointed to draw up the complete rules with the understanding that more than 50 per cent of the points shall be awarded for construction.

COMBAT: This event has been added and the Contest Board has appointed a committee to adopt rules.

MORE ON NATS. Organization of the National Championship Model Airplane Contest to be held at NAS Lakehurst, N. J., and NAS Willow Grove, Pa., from July 27-August 2, will differ from previous years in that a higher echelon of planning is taking place. Since 1950, the actual presentation of the contest has been in the hands of local Exchange Clubs. This year, The National Exchange Club will handle directly the things that local Exchange Clubs have been responsible for, which include pre-contest paper work, soliciting prizes, and countless other details. National Exchange has employed an experienced organizer who will devote his full time to the National Contest from now until the big meet is concluded. Technical personnel, as in previous years, will be composed of AMA leaders. All this points to a better organized and more enjoyable contest for the modeler.

NAVY CARRIER EVENT: Seems as if we must have had our crystal ball polished up pretty well for, after looking at a copy of Lt. Cmdr. Howard Eddy's 1953 Navy Carrier Event Rules and our predictions last January, they're almost the same. The only change we didn't forecast is one that limits the length of the tail hook to one half the length of the fuselage. Those three-foot tail hooks that some have been using didn't look too good! For complete Navy Carrier Rules, suggest you drop a note to Lt. Cmdr. Howard Eddy, Navy Office of Information, Room 4D-718, Pentagon, Washington 25, D. C.

CONTESTS

FEBRUARY

15—*Norwood, Mass.* Class A Norwood Society of Model Engineers' Meet for

(Continued on page 44)

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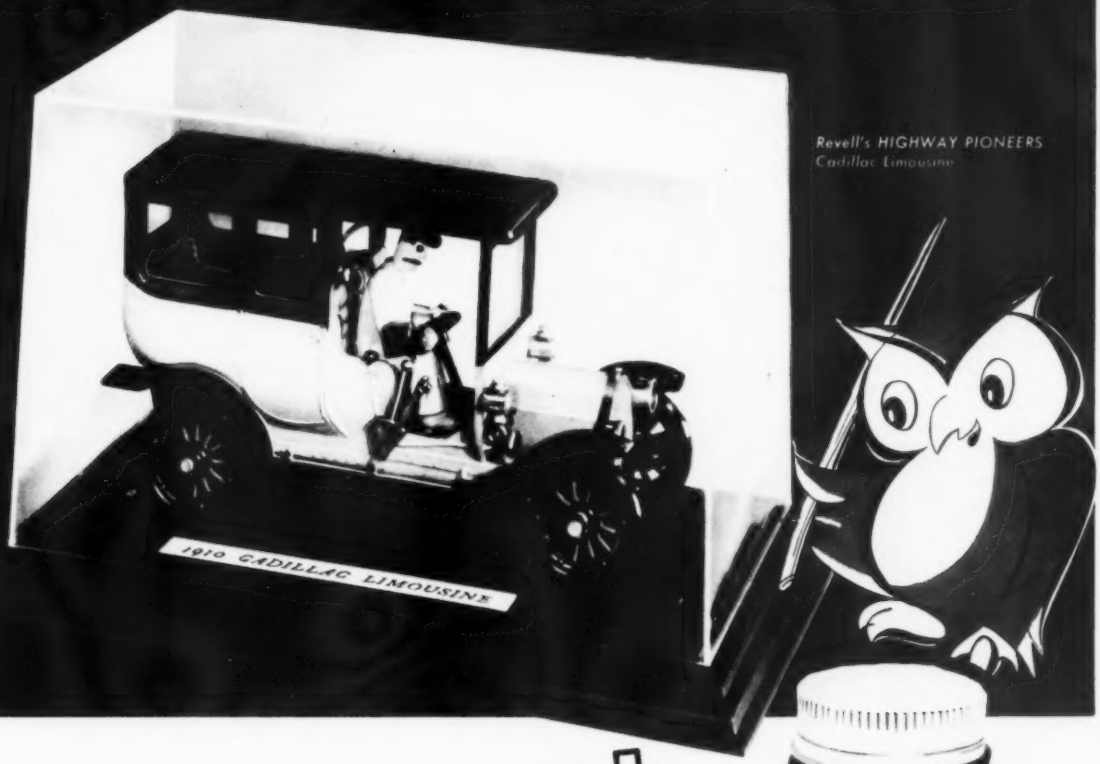

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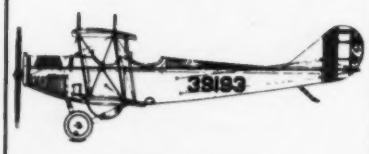

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AMA News

(Continued from page 42)

control line speed, AA free flight gas, outdoor hand-launched glider, PAA Load, and radio control. Albert L. Trefethen, Contest Director, 163 Oakdale Ave., Dedham, Mass. Entry is restricted to members of the N.S.M.E.

MARCH

15—*Norwood, Mass.* Same as February 15 meet.

MAY

3—*Livermore, Calif.* Class AA Oakland Cloud Dusters' First Annual AA Free Flight Team Contest. Hal Roth, Contest Director, 2224 Grant St., Berkeley 3, Calif. Pending.

30 & 31—*Boston, Mass.* Class AAA 1953 7th Annual Plymouth Dealers of Greater Boston Model Plane Contest for all outdoor events. John K. Ross, C. D., 23 Lantern Lane, Wellesley Hills, Mass. Pending.

31—*Easton, Pa.* Pending.

JUNE

7—*Nashville, Tenn.* Pending.

20 & 21—*Atlanta, Ga.* Class AAA 15th Annual Greater Southeastern Model Airplane Contest. Pending.

21—*Philadelphia, Pa.* Philadelphia Plymouth Dealers' Meet. Pending.

26-28—*Detroit, Mich.* Metropolitan Detroit Model Plane Meet. Merrill C. Hamburg, C. D., 4315 Audubon Rd., Detroit 24, Pending.

28—*Hicksville, L. I., N. Y.* Long Island Championship Meet for free flight gas, PAA Load, and radio control. Sidney S. November, C. D., 593 Lenox Rd., Brooklyn, N. Y. Pending.

JULY

27-August 2—*Willow Grove, Pa.* Class AAAA 1953 National Championship Model Airplane Contest.

SEPTEMBER

7—*Far Hills, N. J.* Class AA Bedminster-Far Hills' Model Meet. C. Norman Welsh, C. D., Dumont Rd., Far Hills. Pending.

20—*Harrisburg, Pa.* Class AAA Pennsylvania State Exchange Clubs' Meet. Pending.

Engine Review

(Continued from page 36)

offered in the manual overly detailed and in some ways extremely simplified. He will also find the tankage arrangement less than ideal, and perhaps the method of prop attachment not entirely to his liking. However, all these features are obviously aimed at one purpose—to enable the man who has never handled a model engine in his life to get satisfactory and gratifying results from his first motor, and to offer a logical and effective answer to the many problems of engine handling which would otherwise baffle and discourage him. Since that is the object behind this equipment it fulfills its job admirably.

The design of the engine will be familiar to most Half-A fans. The cylinder has the same radial porting as Bill Atwood's *Wasp* .049, and screws into a cut away thread in the crankcase in a similar manner. The aluminum cylinder head screws onto the cylinder to form a joint where the top rim of the cylinder bottoms inside the head. The bright red color is produced by anodizing. A standard short reach plug is used.

The piston is hardened and features a ball and socket joint for the aluminum conrod, the ball being retained in the socket by a cap which is pressed onto the boss in which the socket recess is machined.

The crankshaft is made from heat treated steel and has sturdy dimensions, with a splined location for the prop driver, standard 1/8" thread for the prop fixing, and a ground finish.

15 Fifteen Famous Fighters 15

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FW-190 Focke Wulf	2.75	F6F Hellcat	2.75
P-40 Warhawk	2.75	F8F Bearcat	2.75
F4U Corsair	2.75	P-38 Lightning	3.50
ME-109 Messerschmitt	2.75	P-47 Thunderbolt	2.95

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The rotary valve port and gas passage are of normal size for an .049 displacement.

The crankcase is a polished aluminum pressure die casting with three point radial mounting and four point beam mounting with slotted holes. The large bore angular air intake has a pressed-in spraybar with pressure rings. The brass needle valve features an ingenious flexible 1-1/2" extension made from braided steel cable which is terminated by a knurled aluminum control knob, and has a small coil spring to prevent vibration from upsetting the adjustment. This arrangement works very smoothly, without the usual mushy response common to most flexible controls, and is a highly successful answer to the knuckle hazard.

The aluminum rear crankcase covers screws into position and the gasket, being of larger outside diameter than the cover flange around which the fuel tank locates, also serves to prevent fuel leakage. The tank is drawn from aluminum, red anodized, and is retained by a center bolt which screws into the crankcase cover. Both filling and vent tubes are provided on both the tanks supplied; in the case of the standard tank they are on top, and may be set up for inverted mounting by rotating the tank, and with the stunt tank the familiar one up, one down vent arrangement is used.

The prop driver is turned from aluminum bar and splined to the crankshaft. Clever spinner design enables this component to actually retain the prop, and its accurate fit on the duralumin sleeve nut enables it to run true without the provision of the usual backplate. This is still the case even when clamping irregularly shaped props. Those who desire may simply substitute regular nut and washer.

One of the most striking features of the Wen-mac is its compact size in comparison with many other .049 engines, and its light weight, complete with tank, prop, spinner and plug, of 1-1/2" ozs.

TEST: Wen-mac .049; Plug—As fitted (1-1/2 volts to start); Fuel—O. & R. AA; Running time prior to test—two hours; Bore—.420"; Stroke—.370"; Weight—1-1/2 ounces (Fully equipped).

Power Prop	*R.P.M.*	*Top Flite*	*R.P.M.*
6 x 5	9,000	6 x 5	7,250 (Erratic)
6 x 4	10,400	6 x 4	9,700
6 x 3	13,100	6 x 3	11,400
5-1/4 x 5	11,500	Wen-mac	15,000
5-1/4 x 4	13,350	Plastic	
5-1/4 x 3	15,600	(as fitted)	

As might be expected from an engine combining a very short stroke and large cylinder port area with early exhaust opening, the low speed performance does not qualify it for "slogging" on a big prop. However, once past the 12,000 mark, this engine really begins to perform. The glo plug supplied is too hot for low revs and preignition is evident at low rpm, but from 12,000 rpm upwards, the exhaust note becomes progressively sweeter and at 15,000 rpm gives that smooth clear whine, without any background noise, that denotes a "happy" engine. In the air on a 5x3 prop, the Wen-mac should comfortably top 17,000 rpm.

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KIT P-3 REPUBLIC THUNDERBOLT
KIT P-4 GRUMMAN HELLCAT 76F
KIT P-5 LOCKHEED LIGHTNING P38
KIT P-6 CLIPPER, JR.
KIT P-7 PEPPER
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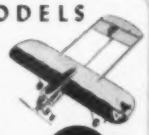

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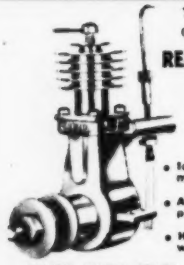

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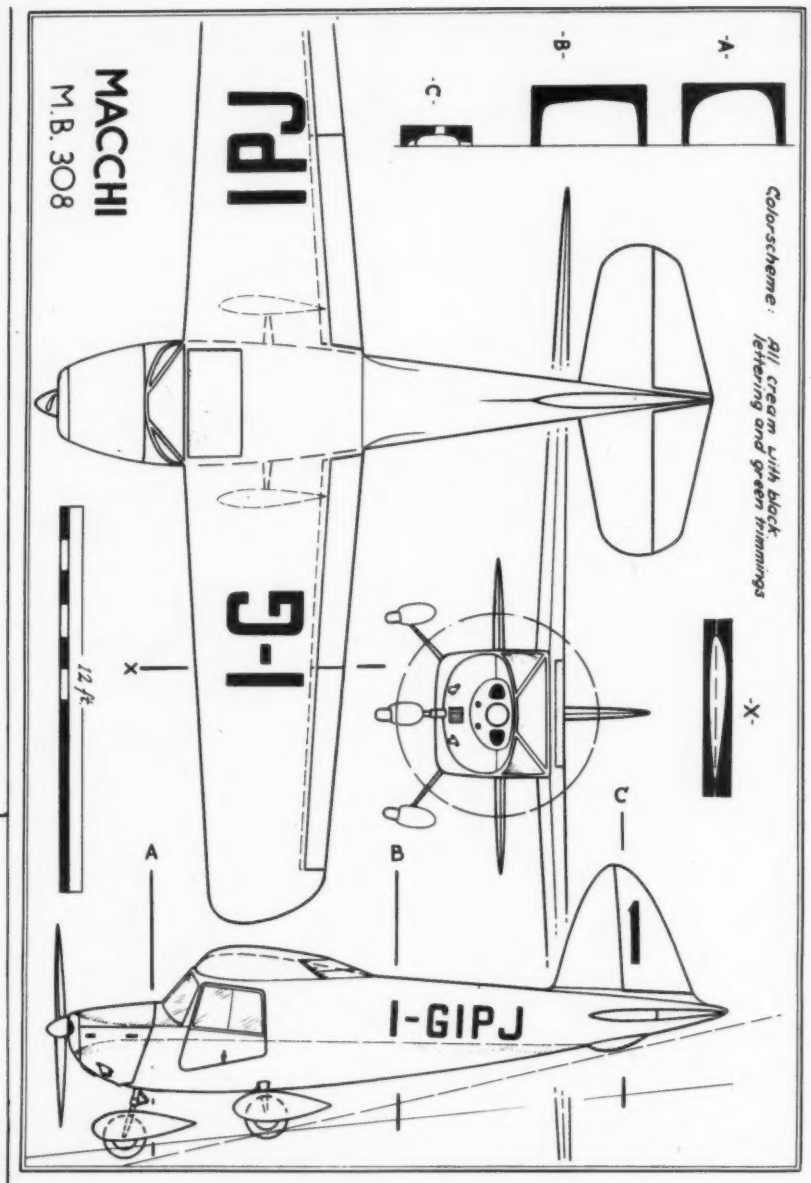

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Long Tom

(Continued from page 21)

your pylon. Select 1/8" x 4" medium hard sheet balsa and laminate at 60 degrees as shown. Put a heavy weight over the pylon and allow cement to dry for at least six hours. Next shape pylon as indicated; sand leading and trailing edges round. Notch pylon to fit over anchor bulkheads and cement firmly into place. Along the side of the pylon, place 3/16" sq. balsa strips between bulkheads as indicated in perspective drawing. Cover bottom of the fuselage with 3/32" x 3" x 56" sheet. Next cover top of fuselage, notch the 3/32" sheet to fit around the pylon, cement into place and allow to dry well. Top covering goes as far back as stab pop-up stop. Cement into place the stabilizer rest as shown. Then cement two plywood gaskets (1/16") to fuselage sides, as indicated, and drill a hole through to insert the stabilizer rubber anchor dowel.

The wing rest: Cement 3/4" x 1/2" balsa strips along each side of top of pylon. Taper them like the trailing edge of the wing. Cement 1/8" sheet on top of pylon with grain running in direction of fuselage width. Cement 1/16" sheet on top of that with grain running length of pylon and sand corners round.

Sub-fire wall: Cut out of 1/16" plywood and cement in place. Drill holes for slippage dowels (1/16" or 3/32") and cement in place. Cut out main fire wall and anchor in place with bike spoke nuts for sanding. Sand fuselage, pylon and tail rest until smooth.

Pin leading edge (1/4" sq. hard balsa) to plans. Spars are 1/8" x 1/2" hard balsa and trailing edge 3/16" x 7/8" medium balsa. Notch trailing edge for rib fitting.

Select 3/32" medium light balsa sheets for the 30 wing ribs. Make your template exact because this wing section plays an important role in performance of the model. Place ribs together with pins and sand so that they will be exact. Now cement ribs in place and cement top 1/8" spar into place. Set dihedral, cement 1/16" plywood gaskets into place. Install wingtips (see perspective drawing).

Cover outer wing panel, leading edge, top side only with 1/32" plus medium sheet balsa. Center section leading edge, 1/16" balsa. Center section is covered with 1/16" medium sheet balsa top and bottom. Wingtips are 1/32" sheet balsa covered.

Cap all ribs with 1/4" x 1/16" soft balsa. Before capping bottom of ribs, cement 1/4" x 1/16" soft strips along bottom of leading edge spar and along bottom of trailing edge on the end. This is done so bottom rib caps will be flush and wing will have a smooth flat bottom. Sand all wing surfaces until they are smooth as glass, using sanding sealer. This is important because a smooth surface means less drag.

The stabilizer is constructed in the same manner as the wing and is laid out over the wing plans. Its outline is indicated by dotted lines which are the stabilizer tips on the plans. All ribs are 3/32" medium and very light balsa. Tips are 7/16" x 1/4" very soft balsa sanded to shape after being cemented to end ribs. Spars are 1/8" sq. hard balsa. Don't splice them because it will weaken stabilizer and induce warping. The trailing edge is 1/8" x 7/8" medium light balsa. The bottom of stabilizer center section is 1/16" medium sheet balsa fill-in between bottom stabilizer spars with grain running chordwise. Leading edge is 1/32" very light sheet balsa covered as indicated in plans. The fill-in between the front two top stab spars is 3/32" medium balsa. Between second top stab spar and trailing edge are 1/4" x 1/16" sheet strips. Remember now the model has a long tail arm and all construction aft of center of gravity, which is located at trailing edge of the wing, must be as light as possible and stab must be constructed with strongest but lightest possible wood. Sand until smooth.

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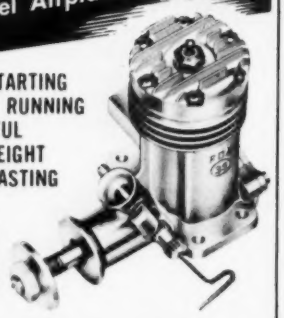

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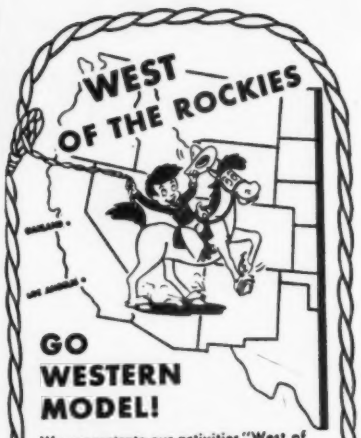

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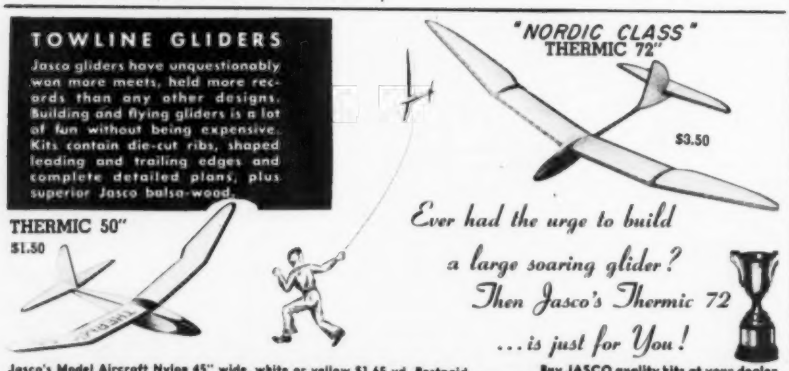

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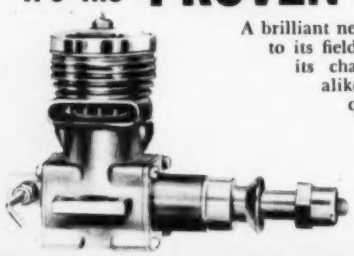

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The rudder is constructed of 3/32" sheet balsa, grain running vertically with a horizontally grained top, and must be of very lightest balsa possible. The dethermalizer pop-up release horn is installed before the rudder is sandwiched between two center ribs; it is held in place by the rudder and must extend at least to the center spar.

The secret of any good covering job is to make sure that all surfaces are sanded smooth. I used Jap tissue but due to its scarcity suggest a light grade of *Silkspan* be used to cut down weight. Silk may be used but you will pay the penalty of weight for the added strength. Under no condition cover stabilizer with silk as its warping tendency is too great. Cover fuselage using butyrate dope. Apply about eight coats, sanding between each coat with very fine sandpaper. You may wax fuselage if desired. Butyrate dope is fuel proof in clear form. Pylon and stab rest are also covered with tissue.

Wing is covered using Jap tissue, light silk, or a light grade of *Silkspan*. Apply tissue using heavy nitrate dope. Wet covering material with a spray gun and allow to dry until taut. Apply eight coats of nitrate dope, thinned down until it brushes smoothly. Add a spoonful of castor oil per quart of dope because this takes some of the warping tendencies out of the dope and adds a plastic like finish. Sand between each coat with very fine sandpaper.

Stab is covered in same manner as the wing, but as stated before use nothing but very light tissue, and thin down dope with extra castor oil so that paper will be lightly taut. Apply about four to five coats of dope. The rudder is covered with light tissue also and doped with four to five coats of dope.

Completing your covering job, use rubbing compound over entire aircraft to secure a polished finish; rub with a light coat of paste wax (Johnson's Glo-Coat). This will take away drag and make aircraft very smooth which will account for an accelerated climb under full power.

As shown in the perspective drawing, a B&B timer tank was used. This is ideal because of less weight, but it will only be suitable for *Torp* 24, 29 and 32 or for and O&R 29. An adaptor plate can be mounted on the B&B Timer tank and a good warm *Torp 19* radial mounted can be used for class A events, but the climb is not as steep. If metal motor mounts are used for installation of Fox 29, 35 or similar power plants using beam type installation, drill holes in back of mounts and use back spoke anchor nut to hold them securely in place. I have used this type of installation on a *Long Tom* "56" Class A ship and it is very satisfactory. When using a B&B Timer Tank, file away flange to make room for bike spoke nut to fit as indicated in perspective drawing. This bike spoke firewall installation is ideal because various engine installations require different firewalls.

Landing gear is held in place as indicated in perspective drawing. Be sure to file nuts down so B&B Timer tank will fit smoothly to firewall. Use a three-inch wheel streamlined for landing gear. Fasten in place with an eye lock nut.

Strap on wings and tail, then pick up ship using your finger placed on rear pylon rubber anchor. My ships balanced at this point. If yours does not, secure an aluminum prop spinner nut to bring nose down until it balances perfectly. Tail can balance slightly low.

Look at the model from a head on view and on outer edge, left of wing rest, place a strip of 1/8" x 1/4" balsa, running the entire length of the pylon. This will make right wing (from a head on view) about 2-1/2" lower than left wing. This is to make model turn into low wing for its glide to left.

Test glide your model. It should have a gradual turn to left in glide as it goes away from you. If it does not, add thinner strips

over those already installed under wing until it does. If it turns to the left but has a tendency to go nose high position, place fine strips of balsa under leading edge of stab to remove nose high gliding attitude. You can also place a thin strip under trailing edge of wing since you may have too much incidence. Now again glide your model; it should have a gradual sinking slow glide to left. Do not take the nose high attitude out by using weight in nose, because if model balances at the right point explained before, it will not require any added weight in nose. Remember now, keep adding shims under the wing (chordwise) until model does glide left.

Throttle down your engine, set for ten-second engine run, light your fuse and release model. It should go about 30 feet in front of you at a 20 degree angle and then climb almost straight up. When it recovers from engine shut off, it should make gliding turns to the left. If it has a tendency to stall because it is not turning tightly enough, raise wing even more until stall is removed. A slight disappearing stall as aircraft glides to the left is desired because model is gliding as slow as possible without coming to a stall. Remember it is very important that the 3/16" downthrust built into firewall should be more than enough to keep model from looping. If model is not climbing steep enough, remove some of downthrust by adding shims under the B&B Timer tank until climb is at desired angle. Engine thrust is at 0 degrees left or right. If model climbs to left or right, install a rudder tab until climb is straight ahead; however, a slight turn in the climb one way or the other does not affect model too much.

Scrap Box

(Continued from page 5)

contest is for control line and f.f. as well as hand and towline glider competition. Last winter it was a huge success. This year it is being held in conjunction with the St. Paul Winter Carnival Fishing Contest.

* * *

A new club organized in Columbus, Ohio, is known as the Columbus *Model Flyers, Inc.* Campbell Field was the organizing grounds. Bill Hale was elected president with Sid Voris taking the V.P. post. Welcome gang!

* * *

If there is an engine shortage, blame Joe Leon Echavarria, III, whose hobby is collecting engines. Has over 160 powerplants, including English, Italian, American, Japanese, and French engines—diesels, glo, and ignition as well as the Dynajets and Mini-jets. All classes from the .020 to the Forster .99. If Joe had a ship for each, that would really be news.

* * *

Continuing our discussion of stunt, looks like we can get down to the old "hassle" per moment arms, power to weight ratios, etc. Of course, everyone has a different theory but paper work results and actual flying results are usually quite different. Maybe no one will agree with our tried theories, but let's get down to some common horse sense as far as u-control stunt jobs go. We know if we have a light power loading, say a ship powered with a Torpedo .29 that weighs around 25 to 30 ounces, it's possible to really turn in a snappy fast performance, providing we don't go cobbing up the works with wrong nose and tail moment arms. What's a tail moment arm? Let's figure it this way, from the center of gravity to the leading edge of the elevators. That's right fellows, where you put the wing and how much span governs the starting place for the moment arm, both nose and tail. Before we get wild and make meaningless quotations by figuring the wing as a flat board, remember the depth of the rib affects the manueverability of the ship. A deep section tends to give you a lighter wing loading.

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passage of air over the highly curved top surface. This stream of air, because it must travel a greater distance than the air stream passing beneath the wing, accelerates or stretches out, thus reducing air pressure immediately above the wing, forming a partial vacuum. This differential of air pressure—that is, less pressure above the wing and more pressure below—is the source of lift. Roughly, two-thirds of the total lift is due to the upper surface of the wing and only one-third to the lower surface when placed at ordinary angles of attack. Naturally, different airfoils have different shapes and are made thusly depending on what the builder desires and what type of ship he wants. Generally speaking, the thicker the airfoil the greater the lift, and drag, the thinner the airfoil the less the lift, and the greater the speed (owing to less drag). The key to the problem of airfoil selection is a factor called the lift-drag ratio, or L/D. Lift-drag ratio is nothing more than the relation between the amount of lift and the amount of drag created per square foot of wing area at any given angle of attack.

Now that we've windbagged a bit about airfoils, let's forget most of it for the moment except the statement "the thicker the airfoil the greater the lift, and drag"—this is generally speaking. In u-control stunt, we usually forget about all of the sections except the symmetrical. The symmetrical section is nothing more than a streamlined rib—same shape top and bottom—which generates little or no lift at a zero zero setting. Naturally this is the type that is used by almost all stunt jobs. With the thicker section, a much less amount of elevator travel is required to execute a maneuver. Tighter maneuvers are more easily done with less power. We know everything that has been said here is just common horse sense, but sometimes we forget it.

Going on into the design of a stunt model, we'll go through a few steps that may help out. First, just what is a thick section? In our *Wee Duper Zilch*, we used approximately 17-1/2 per cent of the chord in the airfoil section. Basic measurements of the *Wee Duper* are: wing span 34"; chord 7-1/2"; fuselage length 18" including area to end of rudder; tail moment arm 34 per cent from c.g. to leading edge of elevator; nose moment arm 42 per cent from c.g. to propeller; tail area, including elevators, approximately 38-sq. inches; elevator area approximately 18-1/2 sq. inches; elevator travel up and down 30 degrees. The bell crank is located at 33 per cent of the chord with wires tapering back to leadout position approximately 2 degrees. The c.g. of the *Wee Duper* is 15 per cent of the wing chord. Weight of ship about 9-1/2 ounces. This is a light wing and power loading. The airplane is maneuverable but not too sensitive. The above moment arms, section, and areas were excellent for contest and combat flying, but for the newer fliers it was a bit easy to overcontrol.

Going on with this particular design, we decided to change the moment arms, etc., and go for more appearance as well as good flying characteristics. Due to the fact that there was plenty of area and the wing loading was light, this was simple. Lengthening the nose moment arm, it was found that we could apply more control without having to worry about bouncing around on pull-outs due to under or overcontrol. Our wing was tapered to eliminate stalling tendencies. In other words, we had more tip lift than was necessary. Landings were a bit more difficult due to the long glide characteristics. The increased nose moment arm practically eliminated this on the stock job. The tapered wing completely eliminated it in the newer experimental job. By the newer experimental job, we mean the latest fiddling that we've done. The latest specifications on the "X" *Wee Duper* (a ship worked up just for kicks) are as follows: span 34"; chord at root 7-1/2"; tip chord 5-1/2"; mean chord 6"; fuselage length 19-1/8"; tail moment

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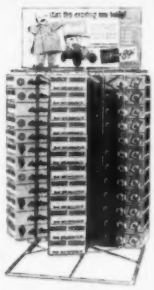

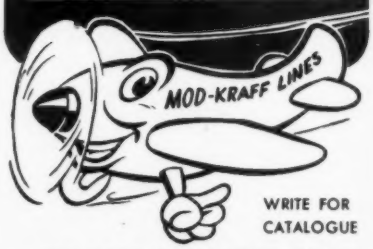

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arm 34 per cent; nose moment arm 52 per cent (both figured from c.g.). The rib sections were tapered to the tip in accordance with the trailing edge. Our tail plane areas remained the same. At the present time we are working with a butterfly tail and the results are very good. Rounding out the whole theory (larger ships have been flown using the above mentioned ratios,) it all boils down to a few short statements. On a fairly sensitive stunt job, by lengthening the nose moment arm, smoother pullouts are more easily made without bothering the maneuverability of the model. This is due mainly to the fact that our wing loading was light. We definitely like the extra area and it can be built in without the "barndoor" appearance if the builder watches it closely. Looks like the appearance points are going to win the contests now. A good flyer with a well finished model can beat the best stunt flyer in the business with a mediocre finish. Because the stunt pattern of today is fairly simple, modelers can go more for appearance and worry less about the flying characteristics. Several of you stunt flyers may not agree with some of our ideas on what a model should be for precision flying, but it seems to work very well. Just thought we would ramble a bit about a few of the things that we've found. We've seen several jobs that don't hit any of the above figures and they seem to do a bang up job of flying, so . . .

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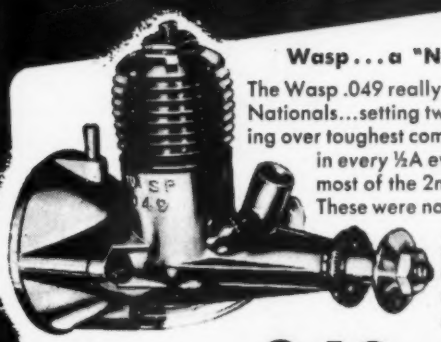

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Planes in the News

(Continued from page 23)

probably is the discharge for the low-pressure boundary-layer air which you generally try to get rid of in such installations.

Now look at the tail. You can't separate tail and fuselage problems any more, and the Saab engineers haven't tried to. What they've done is about the same thing that the North American engineers did with the *F-86D*.

They wanted a horizontal tail which would be adjustable in flight over a fairly large angle. To do this most efficiently, they wanted the inboard end to bear against a flat, vertical surface. That means mounting the horizontal surface on the fin or on the fuselage side at the centerline, if you stick to convention. But Saab and NAA both are convention-breakers; so they designed fairings to receive the horizontal tail root plus all the necessary control boosters and piping to work them. These fairings make a clean flow transition at the fuselage-tail intersection by filling up lots of the area normally left empty beween those two sections. That means the air doesn't break away at high speeds, and that means minimum tail flow problems.

Tricycle landing gear take care of the earthbound phases of life for the *Lance*. The main wheels retract inboard into the fuselage—and if one criticism, may be permitted, their tread is on the narrow side — and the nose wheel retracts forward into the fuselage.

Just ahead of the nosewheel door is a little triangular fin which is one of the many antennas on this all-weather fighter. Saab says all the other antennas are submerged, which means they are built into the airplane so that they lie flush with a surface somewhere. Favorite spots are the tail fin—where the darker area apparently marks a fiberglas housing of one type—wingtips and inside the canopy. Armament on the *Lance* is a collection of cannon, bombs and rockets.

Incidentally, the *Lance* is the third "different" design to come from the Saab drawing boards. (The other two were the *Draken* and the *J29.)*

▸ *Hydro-ski*—Someday in the near future a big cargo plane will take off the water on a couple of water-skis. It won't have to have a Vee-bottom, reinforced to take the pounding of waves and water takeoffs and landings. It won't need the fancy stepped-hull layout with its wasted space. All it will need will be a pair of hydro-skis, the latest gimmick to make military aircraft more adaptable to landing conditions the world over.

With hydro-skis, planes will be able to operate off water, ice, snow, land and wet grass.

It's not one of those distant developments, either. Flight tests have been going on since 1948, and Convair's new supersonic *F2Y-1* flying-boat fighter will soon takeoff on hydro-skis. They're nothing more than water-skis. Basically, they are a long, flat aluminum structure with a planing bottom and a cambered upper surface. They work this way:

The plane sits on the water like a duck, with its bottom wet. Down underneath is the extended hydro-ski. When the plane begins to move, the ski begins to lift in the water and hoists the plane off the surface. It then planes along on the lower surface of the ski until flight speed is reached and off the aircraft goes.

Now you can see from this description that the hydro-ski is first, simple and light, and second, easily retracted. It's one of these simple ideas that's been around for years—it was used, for example, before World War One on a fighter, and later on the Piaggio racer built for the Schneider Trophy races. But we've had to wait for lots of research work to be done.

▸ *Campbell Report* — The big issue of the Campbell report, which proposed that we cut the fat out of the aircraft budget and eliminate or cutback a lot of obsolescent airplanes, is

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rocking the industry. In earlier stories on the subject, *Planes in the News* gave first the original report, then the eventual (so we thought) disposition, which was—as far as the industry was concerned—a complete refutation of the whole thing.

It is now a distinct pleasure to report again, and this time to say that cooler—and wiser—heads have prevailed and airplane orders will be cut back. In sum, the cutbacks which were made recently by the Navy and the Air Force reflect the specific recommendations of the Campbell report. Not every one of the far-reaching suggestions was implemented by the services, but they came pretty close.

For instance: Northrop's *F-89* program and production of the Lockheed *F-94C* have been cutback to a lower level by the Air Force. The Navy axe hit heavily at Grumann, with cancellation of about one-fifth of its *F9F-6 Cougar* program. Douglas *AD-5* production is to be rolled back, and North American's *FJ-2 Fury* will be reduced by one-third.

▸ *And In England*—The situation is much the same in England. There things have been getting tougher than anyone expected. Defense economy has been reduced sharply because of the British military view that the Russian situation is not so critical any more, and that it will be a long cold war with the Reds rather than a short hot one that we must prepare for.

So the British have cut back on many types, also. Hardest hit are the *Canberras*. Avro just delivered its first under a subcontracting program to the original manufacturer, English Electric. Shorts also has recently delivered its first. Now subcontracting on the plane has been cut back sharply and there is a possibility that it will be eliminated altogether.

In night-fighters, the de Havilland *Venom* and the Armstrong-Whitworth *NF-11* have been cutback to make funds available for the Gloster *Javelin*, twin-jet delta-winged fighter. And only token orders will be the fate of the production programs for the Vickers *Valiant*, the Avro *Vulcan* and the unnamed Handley Page *HP 80*, a crescent-winged bomber, dogged by an unusual streak of bad luck.

▸ *Bits and Pieces*—In England, another research aircraft, this time the Short *S.B.5*, has made its first flight. This plane has variable-sweep wings, like the Bell *X-5*, but they are only ground-variable and cannot be shifted around in flight. The *S.B.5* has a high Tee-tail, about 50 deg. maximum wing sweep, and is powered by a Rolls-Royce *Derwent* engine. Incidentally, that's where all good *Derwents* go—into special test or research aircraft. Look down the list sometime . . . Republic has delivered its first *F-84F* to the Air Force. Republic also made headlines with the supersonic flight of its *XF-91*, combination turbojet and rocket fighter. The company says it is the first rocket flight by a combat type of aircraft, and that's so. It's always been a mystery to me why nothing was ever done with the *XF-91* because it seemed like a good idea at the time. The *XF-91* has been around for some years now—it flew in mid-1949. So has the Convair delta-winged *F-92*, and it won't be for some time until the technical knowledge gained by those two types, for example, will be built into new fighters. Meantime we've lost that most precious commodity, time . . . In case you've wondered about the eventual fate of the huge Convair investment at Ft. Worth, worry no longer. The Air Force is getting ready to buy a supersonic bomber from Convair, a smaller design than *B-52* and *B-60*, and probably a delta-winged layout to boot. Convair has been studying the general bomber problem for most of the post-war years and probably has more specialized knowledge under one roof at Ft. Worth than manufacturer has with any other class of airplane . . . The red-hot Russian rocket fighter revealed with much fan-fare in a contemporary publication is — as far as I can see — the ex-German *DFS-346* research aircraft with a new nose. It's got a skid landing gear and a prone pilot and a rocket engine plus tanks in the fuselage. But you never saw so much spare space in a fuselage. If I were the chief engineer, I'd fire the designer for an extremely inefficient layout. But I don't think that's going to be necessary, because I doubt that the airplane

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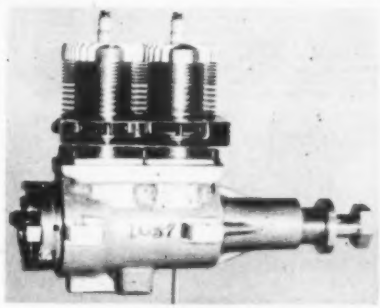

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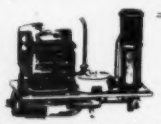
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exists. As an extra, consider the prone pilot in a rocket airplane. The reason a pilot lies prone is to take high G loadings during maneuvering. In a rocket fighter, the greatest accelerations—and therefore greatest G loads on the pilot—are likely to be along the line of flight. Thus lying prone is no protection at all, and the pilot would be better off sitting up. But let's not tell the Russians, shall we?

The Supermarine Attacker

(Continued from page 31)

stations three and four is the same size as the number four former. Add the circular former, former 11, using rubber bands to hold the longerons together until the cement dries. Locate the rubber band close to the former to minimize the strain and do not use more pressure than is necessary.

Very soft 1/2" sheet is used to make the tail ring. Use former 11 for the outside diameter and then cut a 1-1/4" hole in the center to allow clearance for the augmentor tube. This is cemented to the back of former 11 so that the two form a single piece.

Add the stringers to the top and sides using 3/32" medium hard strips. The bottom is left open at this time. Fill in the 1/16" sheet fairing to the top and bottom of the air intake blocks. The lower sheet fairing goes back to former six as it acts as a mounting point for the wing panels. The top of the fuselage from former nine back is filled in with 1/16" sheet strengthening this point for the rudder and stabilizer mounting.

Between points X-X on the bottom of the fuselage there is a removable section for access to the jet unit. Cut a 1/8" sheet floor to fit between the longerons from station three to five. Insert this piece but do not cement it in place. Cement formers to this floor at the front and rear—this doubles the formers at stations three and five. Attach two pieces of 3/16" square along the edges of this floor and between the two formers. When finished the strips should be flush with the outer edge of the longerons. Trim the edges of a third former so that it will fit in the center of this assembly between the strips. Taper the 3/16" strips so that they follow the curve of the formers. Add all of the bottom stringers and place small balsa shims under the center stringer at the front and rear of the detachable unit. Sand the entire assembly smooth and cut the stringers apart at X-X. Push this unit out.

Add the nose block and front stringers. The outline for these is shown above the nose drawing. Carve and sand the nose block into shape. Sand the entire fuselage to remove all irregularities in construction.

A small section of 1/4" sheet must be placed under the Jetex mount to center the nozzle with the augmentor tube. Screw the Jetex mounting clip and the sheet section on to the motor floor. Place the unit back in the fuselage and sight down the rear of the augmentor tube to check alignment. Move the unit around until it is properly centered. Having found the correct location you should cement the parts in.

The wing structure is simple. The root rib is mounted at an angle so that it is flush with the top of rib two when the area between them is filled in with 1/16" sheet. The angle will give the proper dihedral when the wing is mounted on the fuselage. As a suggestion, mark the spar notches on the upper camber and cut them in after the wing is assembled. The 1/8" spar is used to provide a mounting point for the landing gear struts. After bending the struts, insert them through the 1/8" spars along side of ribs three. A small strip of 1/8" square is slotted so that when it is cemented in it will cover and support the wire. Fill in the lower camber, at this point, with 1/16" sheet. After adding all of the spars you can sand the entire wing until all parts fair smoothly. The wing is covered after it is attached to the fuselage. Cover the fuselage first.

Cut the rudder outline from 1/8" sheet and add the 1/4" to the lower section. Center this section between the outline. Add the ribs. Carve the lower section of the rudder into an airfoil shape.

Use 3/16" sheet for the elevators. Sand these into an airfoil shape and taper them toward the tips. Block up the tips 7/8 of an inch and sand in the angle. Use the fuselage as a sanding block by placing sand paper at the point where the elevators will mount and lightly sand the units to a smooth fit. Final dihedral is 7/8 of an inch under each tip.

Covering is very simple using wet lightweight *Silkspan*. First cover the top and bottom of the fuselage going around the sides as far as possible without creating wrinkles. This will leave two open areas on the sides about two stringers wide. Of course it will be necessary to use two separate pieces to cover the open areas in front of the air intakes. When the covering is dry apply at least two coats of clear dope. Mount the wings at the location shown on the plans. Note that the bottom of the ribs is flush with the lower longerons. The wing can now be covered. Dope the same as the fuselage. Both the rudder and elevators are covered. The covering helps to seal the grain on the sheet elevators. Attach these units to the fuselage and check their angles. Use the upper longerons as a guide for the stabilizer. The trailing edges should be about 1/16 of an inch above the bottom of both longerons while the leading edge will be flush or even with the bottom. The wheel covers should be cemented to the landing gear struts.

When you have finished clear doping you can begin to add the details. Use 1/8" dowel for the landing lights on the wings. These can later be painted red and green. Piano wire is used for all of the antennae. The lower dipole serves as a finger grip to aid in removing the jet unit. Sheet metal of any type is used to make the arrester hook and the rudder horn. Attach all of these details before color doping. The pilot head and canopy will be added after.

Use aircraft grey dope and paint the entire model with two coats. Then paint the upper surfaces of the wing, stabilizer and fuselage with medium green. The upper part of the fuselage, "turtle deck", starts even with the stabilizer and is a straight line forward to just in front of the canopy. This latter is known as an *F-94* canopy at your dealer.

English red, white and blue decals are used for insignia. The wing has them on both top and bottom. A red, white and blue band is used at the leading edge of the rudder. Decal numbers are used on the lower surfaces of the wings only. These are one inch high and authentic letter combinations are WA and TF. These letters are followed by three numbers. You can use your AMA license numbers by using MA and the first three numbers.

Control surfaces and line details can be added using black model railroad paint. This takes longer to dry and works well in a ruling pen. All antennae should be painted red.

The motor unit should have a tight fit so that it will not be necessary to use rubber bands or hooks. If it is loose, add small pieces of sandpaper at the face of the formers until a snug fit is affected. Glide the model over tall grass and use weight to obtain the proper trim. For a stall add weight to the nose and for a dive add weight to the tail. The original glided without trim. First flights should be made without turn adjustments. A slight stall under power might be noted. It is not possible to retard the Jetex unit but thrust can be reduced by using a small balsa plug in the rear of the augmentor tube. This plug should be centered so that a slot is open on both sides of the plug — about 1/4" slots. This blocks off about half of the augmentor tube and creates a back pressure. Low power flights are possible in this way. After final adjustments this plug should be removed. A small tab is added to rear of the rudder for turn adjustments. The climb will be fast and flat. END

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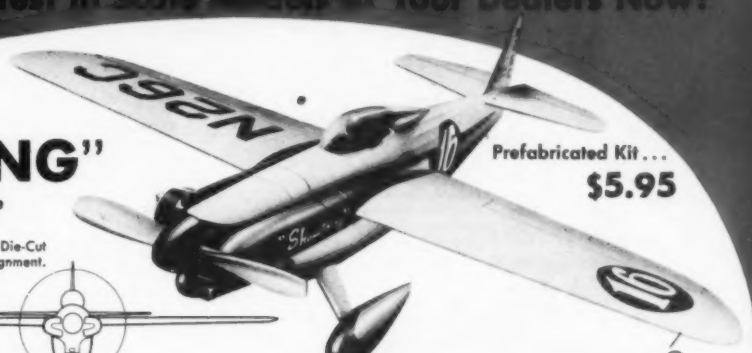

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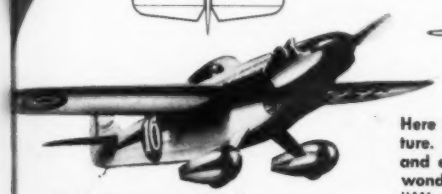

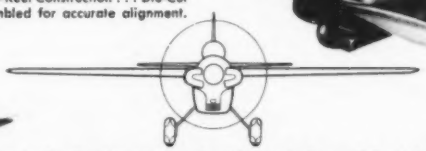

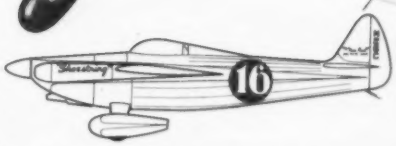

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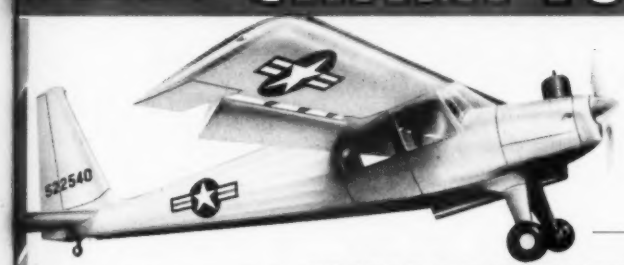

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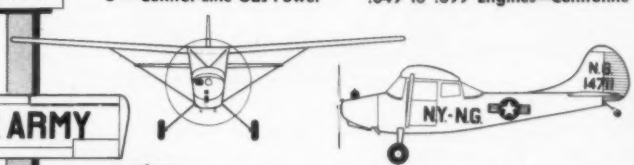

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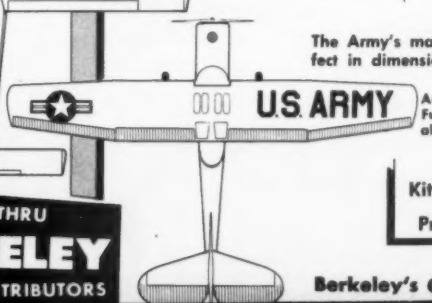

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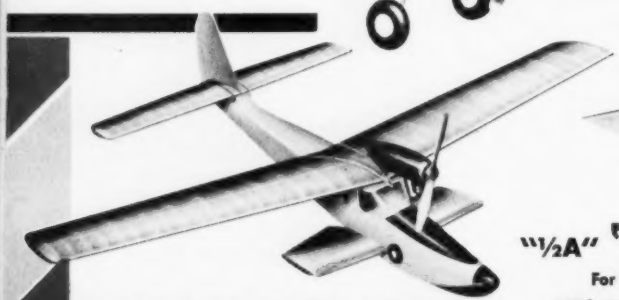

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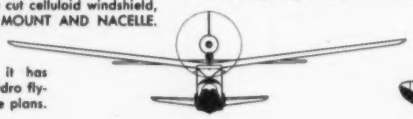

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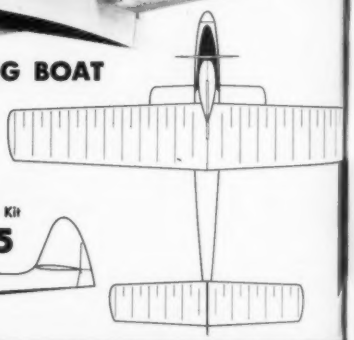

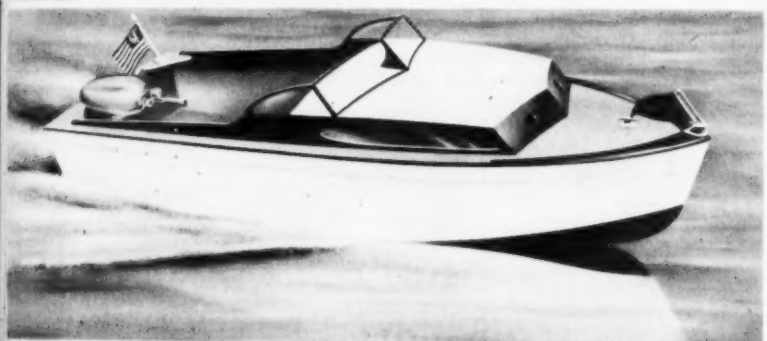

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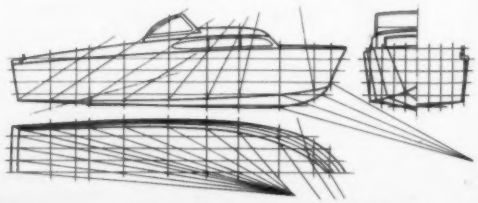

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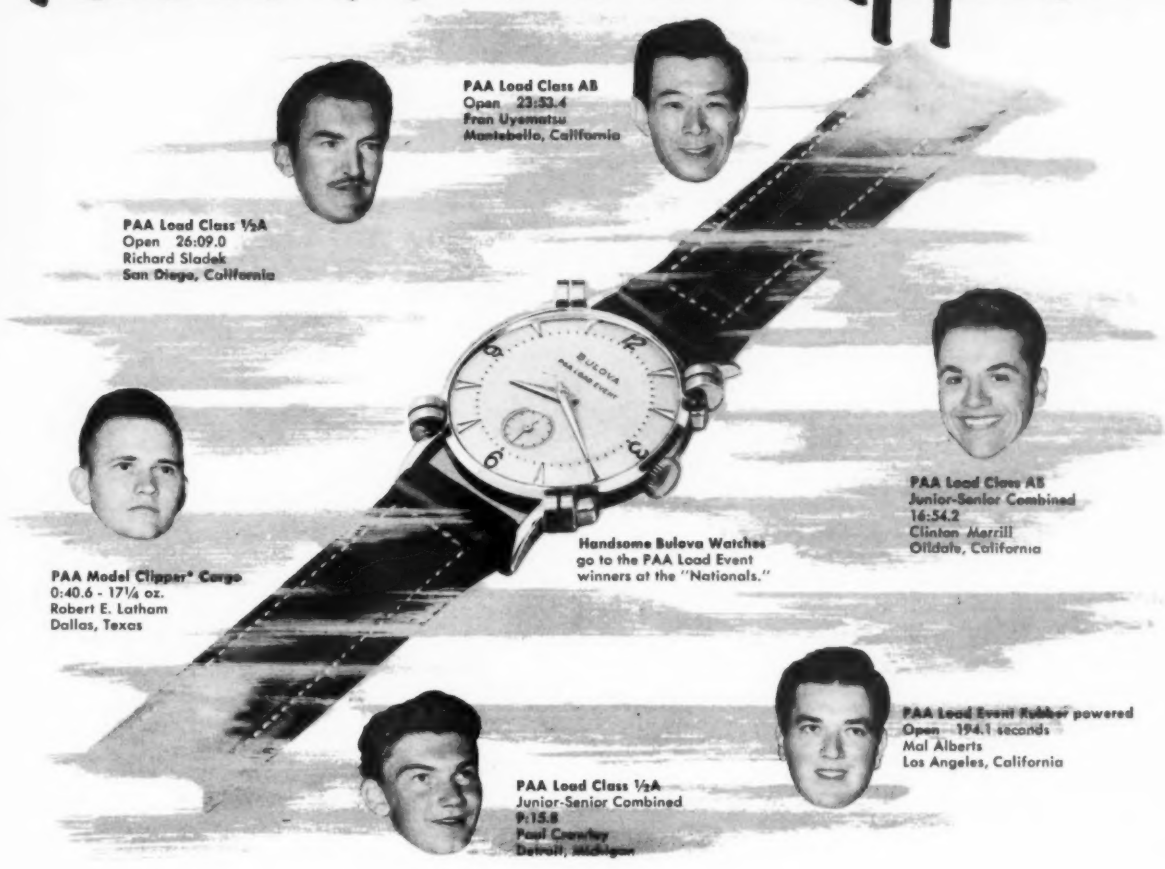

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These exciting contests provide model flying that brings out the basic purpose of aviation itself—*to carry a payload.*

First sponsored by Pan American in 1948, payload events are free flight headliners at many local and regional meets—and a highlight of the "Nationals." Start your payloader today.

For rules and specifications for 1953 PAA Load Events, write to: Educational Director, 28-19 Bridge Plaza North, Long Island City 1, New York.

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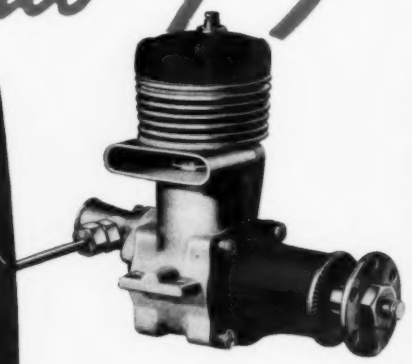

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ENGINE SPECIFICATIONS

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Stroke	.630"
Displacement	.195"
Wt. in ounces	4.0
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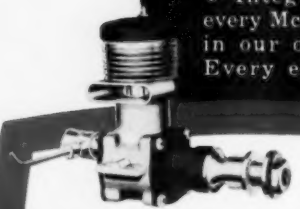

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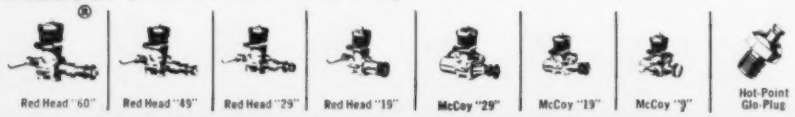

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